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# THE IRON AGE

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# THE IRON AGE

New York, Thursday, December 23, 1909.

## A Murray Laboratory Engine.

For use in the mechanical laboratory of the University of Nebraska at Lincoln, Neb., the Murray Iron Works Company, Burlington, Iowa, has built a cross compound Corliss engine which is special in some of its details on account of the fact that it is intended solely for the instruction of students in the conduct of engine tests. The flywheel, for example, has a flange on its rim extending inwardly to retain cooling water

there are arrangements so that the engine may be run either condensing or noncondensing with or without steam in the reheating tubes in the receiver, and either engine may be run separately. There are also pipe connections from the main steam pipe to the cylinder barrel and the head jacket and from the jacket to traps fitted with valves, so that steam at various pressures can be admitted to any one or all of the jackets.

The engine has 10 and 20 in. x 24 in. cylinders, and a rolling mill type of frame. It is capable of developing 114 indicated horsepower at 125 rev. per min.,

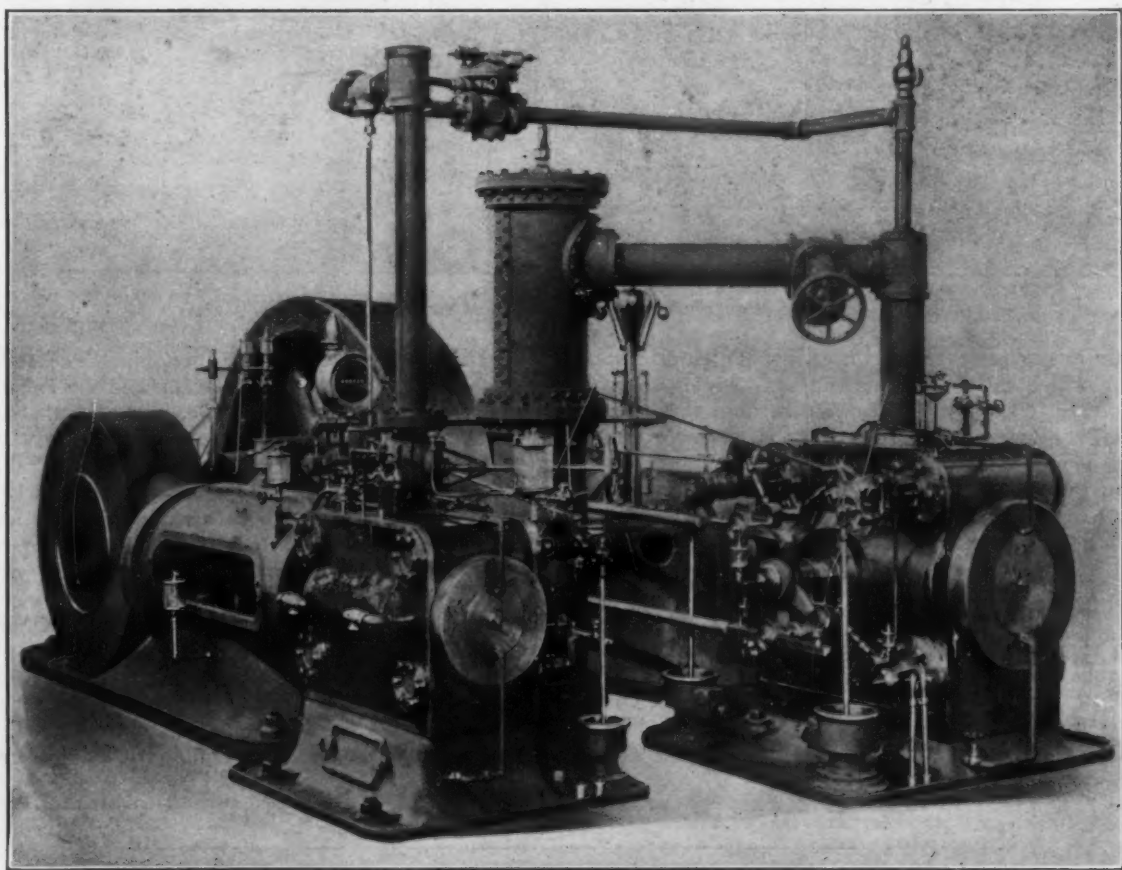


Fig. 1.—A Cross Compound Corliss Engine Built for the University of Nebraska by the Murray Iron Works Company, Burlington, Iowa.

when the engine is run with a brake applied to the flywheel. The connecting rods have stub ends for the cross head pins, but strap ends for the crank pins, so that they can be quickly taken down when either side of the engine is to be run simple. The cross heads are fitted with babbitt faced adjustable shoes so arranged that they may be taken out and put back without removing the cross head from the guides or disconnecting it from the piston or connecting rods. It is fastened to the piston rod with a special screw thread, and is locked with a large nut. A counterweight is furnished to fit on the crank pin of either engine, so that when the connecting rod is disconnected and the other side is running simple the main shaft will still be in balance. Ten interchangeable governor pulleys are provided so that engine may be run at various speeds from 60 to 150 rev. per min. A steel scale divided into 1-100 in. is fastened to the governor column and a pointer to the governor head to permit of reading the governor position while it is in motion. In the pipe connections

with 150 lb. initial steam pressure and 26-in. vacuum when cutting off at about 0.16 stroke in the high pressure cylinders. Figs. 1 and 2 show two views of the engine, and Fig. 3 a plan showing the principal overall dimensions and the floor space occupied.

The high and low pressure cylinders are designed to safely withstand a steam pressure of 175 lb. gauge after one reboring. The cylinders are steam jacketed on the barrels and heads for full boiler pressure or less, and the barrel jackets have expansion rings cast in them. The frames are one-piece castings, with oil retaining rings around the base. The guides are bored, and the main bearing boxes are adjustable vertically and horizontally. The cylinder bases are of the pedestal type, and extend under the valve gear with an oil retaining rim all around and have the dash pots bolted to them.

The band balanced flywheel is 8 ft. in diameter by 16-in. face, and weighs 7500 lb. It is cast in one piece and has a split clamp hub, and a water retaining flange

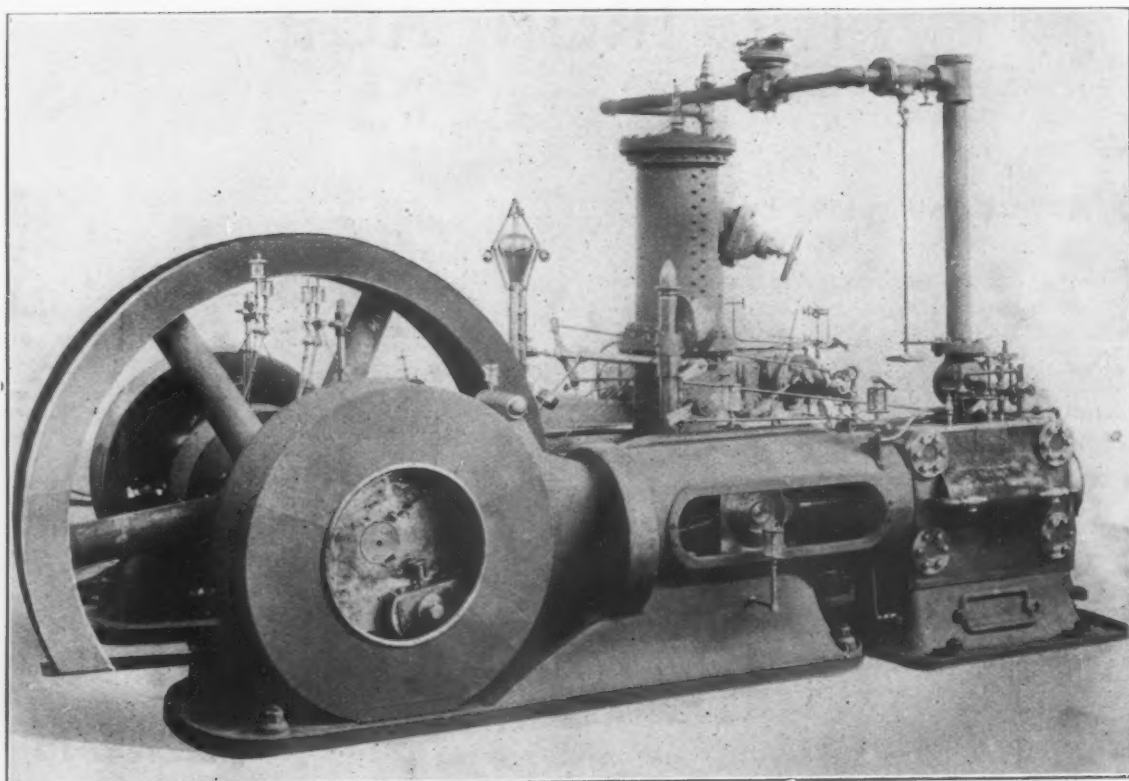


Fig. 2.—A View of the High Pressure Side of the 10 and 20 by 24-In. Murray Engine

as before mentioned. The flywheel is mounted on a 9-in. shaft, which is  $94\frac{3}{4}$  in. long center to center of the crank pins. It is of mild steel, polished in the bearings, and is fitted with four eccentrics, a governor pulley and counterbalanced disk cranks, turned and polished on the faces and rims. The main bearing is 7 x 14 in.; the crank pins,  $3\frac{1}{2}$  x  $4\frac{1}{2}$  in.; the cross head pins, 3 x  $4\frac{1}{2}$  in., and the cross head shoes,  $6\frac{1}{2}$  in. wide by  $16\frac{1}{2}$  in. long.

The pistons are of the solid type without follower bolts. They are fitted with self-adjusting sectional packing rings and Allan metal antifriction rings. The piston rods are forced into the pistons by hydraulic pressure, and are locked with a forged steel nut. The piston is recessed to receive the nut so as to reduce clearance. The valves and ports are of sufficient size

for an engine speed of 150 rev. per min. The steam valves open with the current of steam, and the exhaust valves entirely fill the chambers and have ports through them. The high and low pressure valve gears are operated by separate eccentrics, giving a cut-off range from lead to five-eighths of the stroke; the steam and exhaust hook rods are fitted with disconnecting devices. The split eccentric straps are fitted with brass liners, so that they may be quickly removed and replaced without causing misadjustment of the valve gears. Accident proof vacuum dash pots are bolted to the cylinder bases.

The governor is of the Murray high speed fly ball type with ball bearings. The governor with the center weight is mounted on the low pressure frame, and is connected by a cross shaft to a stand on the high pres-

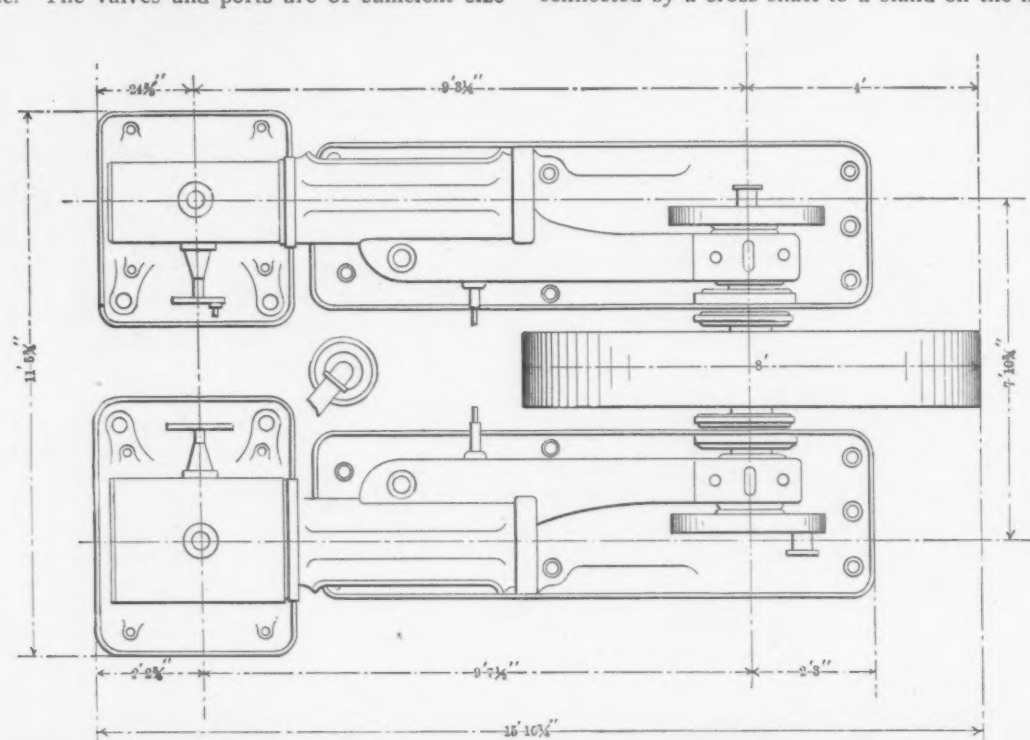


Fig. 3.—Plan View of the Engine, Giving Principal Dimensions.

sure frame fitted with roller bearings. The governor is so arranged that the cut-off in the low pressure cylinder may be shortened or lengthened to increase or decrease the receiver pressure. Between the engine cylinders is mounted a vertical type receiver fitted with tinned brass reheating tubes, relief valve, reducing valve and drain traps. On both cylinders spring loaded relief valves are provided and piping for the attachment of steam engine indicators, and indicator connections on the steam chest and throttle valves. Lubrication is provided by a power driven cylinder oil pump on each engine connecting to a distributing system including telescoping tubes leading to the cross head pins and eccentrics, the pendulum centrifugal crank pin oilers and a full set of oil and grease cups.

All of the gauges necessary in tests recording the pressures of the steam, vacuum in the condenser, &c., are mounted on a gauge board close to the engine. A revolution counter is attached to the engine. The complete weight of the engine is 45,600 lb.

### The Cincinnati Metal Trades.

#### Quarterly Dinner, December 15.

Rounding out its first decade of usefulness, the December dinner of the Cincinnati branch of the National Metal Trades Association was a memorable event. The banquet room of the Business Men's Club was used for the purpose, one-half of its width being reserved for later occupancy by students in the co-operative courses at the University of Cincinnati.

The guests and speakers included prominent manufacturers and men of affairs from leading trade centers both East and West. President John W. Neil, in calling the assemblage to order, commented on the particularly felicitous character of the meeting and noted the absence of but one expected guest, Edwin E. Bartlett, president of the Boston branch, whose telegram of regrets he read. Illness kept Mr. Bartlett at home.

#### Dr. Tolman's Address.

The first speaker on the programme was Dr. Wm. H. Tolman, director of the Museum of Safety and Sanitation, New York. Dr. Tolman illustrated his exceedingly interesting lecture with lantern slides. He referred to *The Iron Age* in complimentary terms several times, noting the prominent part it had taken in the organization of the Museum of Safety and its editors' co-operation on the committees and otherwise. The speaker also gratefully acknowledged the helpful spirit and sympathy manifested by members of the Cincinnati branch.

#### C. H. Norton's Address.

The next speaker was C. H. Norton, Norton Grinding Company, Worcester, Mass. He was evidently regarded as a man of agreeable diversity as a speaker, for he was in demand on at least three subjects, treating of industrial development, foreign competition and the technical end of his own business—grinding. The last topic seemed to outweigh others in the minds of his technical hearers, for he was prevailed to talk on cylindrical grinding. He prefaced his discussion of grinding with remarks equally helpful to inventor, designer and tool builder. "As manufacturers," said he, "we are too thoughtless and often guilty of failure to co-operate intelligently with these good servants of ours." He told of trials and difficulties attending some of the demonstrators sent out by firms to illustrate the workings of new machines; the frequent lack of friendly and businesslike co-operation which entailed many hardships on the demonstrator besides contributing to the expense account of the manufacturer. "Are we not," he asked, impressively, "imposing a little too much on the designer, inventor and tool builder?"

Taking up cylindrical grinding, Mr. Norton told what it is technically, and dispelled a number of erroneous trade ideas. The complicated process of manufac-

ture of emery wheels was outlined. Mined in Arkansas and Tennessee, the material is taken by his company to Niagara Falls to undergo electrical treatment, then shipped to Worcester, where it is made into the finished product. Mr. Norton decried the supposed danger of liability of explosion from centrifugal force. He told of the perfect testing process and the inflexible rule that required the maker of every tested and finished wheel to provide an affidavit before a notary in accordance with the findings at the special test provided. He was not unmindful of the moral effect of his words on the assembled 100 and more youthful students in the co-operative courses, and addressed himself often to them. He gave interesting bits of history of cylindrical grinding, tracing its origin from the investigations and experiments of J. Morton Poole in 1866, who realized that the ordinary lathe could not provide him an accurate roll for paper making and substituted the grinding wheel therefor. The outcome was the roll grinding machine of the present.

#### Addresses of John E. Kirby, Jr., Charles H. Davis and Dean Schneider.

John E. Kirby, Jr., of Dayton, president of the National Association of Manufacturers and of the Dayton Association also since its inception, was the next interesting speaker. The keynote of Mr. Kirby's talk, and which received the vociferous indorsement of his nearly 300 hearers, was "the National Metal Trades Association has done more lasting good for labor than all other organizations combined. The National Metal Trades Association has done more toward solving the weighty problems that confront the manufacturer to-day, accomplished more through its Declaration of Principles than any other or similar organization in existence." He did not mince his words in dealing with the more recent developments in the labor world.

Charles H. Davis, Warner Gear Company, Muncie, Ind., talked impressively of the inspiration to be gathered from the sight of the youths who sat nearby, attentive and watchful for ideas helpful to them. He said that the Muncie manufacturers are working on a plan to provide the co-operative principle.

It was several minutes until Dean Schneider of the University of Cincinnati engineering department, the man who invented the co-operative educational idea, could be heard, so insistent was the applause.

#### Addresses of H. P. Eells and Frederick A. Geier.

H. P. Eells, president of the National Metal Trades Association, who was the next speaker, met with instantaneous favor by announcing impressively that the Cincinnati branch is the strongest and one of the most aggressive in the national body. He recalled a former visit to Cincinnati when his firm had under consideration affiliation with the organization. He attributed the remarkable spirit of enterprise manifest among Cincinnati members to the friendly and cordial relations existing among them and the individual interest taken by members in the work of the association, not forgetting Secretary Manley, whom he warmly eulogized, commending the Cincinnati body as an example of what such an organization should be.

In conformity with the usual custom at these quarterly dinners, a member of the branch was called upon to express membership appreciation of the efforts put forth by the guests, and as usual this honor fell to Frederick A. Geier, who is especially qualified for performing such a duty. In the course of his remarks he referred to the accomplishments of the past year or so in securing the appropriation for the \$300,000 engineering college, the completion of two new technical high schools, and the beginning of the \$650,000 new Ohio Mechanics' Institute building as incidents in the transformation of the Cincinnati branch from its modest beginning to its present commanding position. Mr. Geier feels that problems of pensions, liability insurance and similar accomplishments in the interests of labor are matters for early consideration by the association.



## The Bucyrus Locomotive Pile Driver.\*

BY WALTER FERRIS, SOUTH MILWAUKEE, WIS.†

The machine described is of some engineering interest as the most substantial and complete railway pile driver yet produced. Its special claims to consideration as a new development in mechanical engineering, however, lie in the unusual arrangement and strength of the self-propelling mechanism, and in the self-contained hydraulic turntable, whereby the entire machine, including trucks, is quickly lifted clear of the rails and turned end for end. The propelling engines, mounted on the car body and delivering more than 250 hp., are connected to the axles of ordinary bogie trucks without interfering with the movements of the trucks in turning curves, passing over frogs and the like.

The machine was designed to meet the requirements of the Atchison, Topeka & Santa Fé Railway system, for a pile driver capable of climbing any grade on the line and hauling its own cars of piles, tools, &c. The self-propelling pile drivers built hitherto are capable of moving themselves for short distances while at work,

The car is 40 ft. long, built entirely of structural steel and steel castings. On the front end is mounted the swinging frame, shown in Figs. 1, 3 and 4, consisting of a pair of parallel trusses supporting the leaders at one end and a counterweight at the other end with the parts for raising and lowering the leaders and swinging the entire frame to the right or left at right angles to the car body. This frame is swung by a large worm wheel, which also serves to raise and lower the leaders.

The latter operations are accomplished through the long worm wheel hub projecting upward through the center pintle upon which the swinging frame revolves, with a double grooved sheave or drum keyed to the upper end of the worm wheel hub. This drum is provided with a clutch by which it can be engaged with the main base plate of the revolving frame. When this clutch engages with the swinging frame the latter moves with the worm wheel. When the clutch is disengaged and a brake is applied between the car body and the swinging frame, the revolution of the worm wheel does not carry the swinging frame with it, but merely turns the drum, which is keyed to the worm wheel. The ropes leading from the drum to either end of the revolving frame are so arranged as to raise or

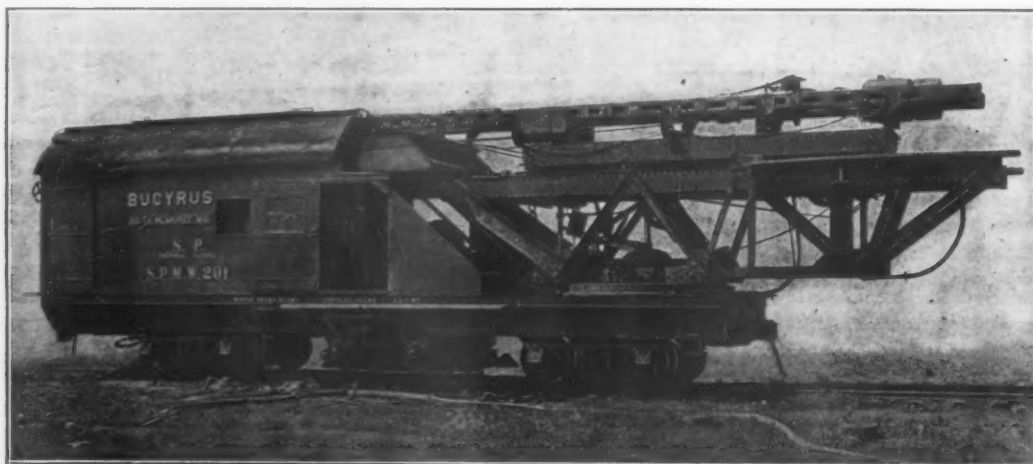


Fig. 1.—The Bucyrus Locomotive Pile Driver with Leaders Folded in Shipping Position.

but from lack of sufficient steam capacity as well as engine power must have a locomotive in constant attendance. After having used several self-propelling machines, A. F. Robinson, bridge engineer of the Santa Fé system, prepared specifications calling for a pile driver of much higher propelling power. This resulted in the designing by the Bucyrus Company of the machine herein described, which has been in active service on the Santa Fé lines since January, 1909.

The general appearance of the machine is shown in the illustrations. Fig. 1 shows the machine with leaders folded in shipping position. Fig. 3 shows the leaders up ready for driving with the swinging frame turned across the track, and also shows how the counterweight on the opposite side of the swinging frame balances the weight of the leaders, keeping the machine always stable. In this position a pile can be driven 19 ft. from the center of the track. Fig. 4 shows the machine standing on its hydraulic turntable with all wheels in the air. In this position and without any blocking the pile was picked up, put in place in the leaders and driven at a distance of 32 ft. from the center of the track. It was not desirable to drive this pile all the way in and the leaders were therefore backed down to clear the partially driven pile. The principal use of the hydraulic turntable, which will be described later on, is to turn the machine end for end when there is no railway turntable or Y available.

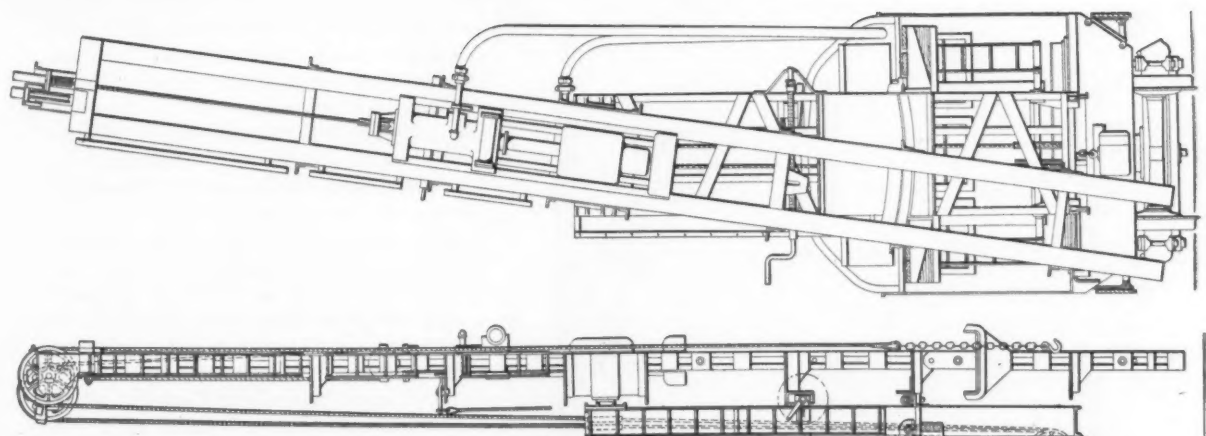
Fig. 2 shows the general arrangement of machinery.

lower the leaders. The revolving frame is provided with four conical rollers which rest upon the finished upper surface of the base plate.

From Fig. 2 it may be seen that the leaders are mounted on a leader raising frame by a pivot near the center of the leaders. A screw and nut device takes hold of the leaders some distance below the pivot and with this they can be inclined either to right or left so as to drive batter piles. The arrangement for raising and lowering the leaders acts directly upon the raising frame, which is carried by two rolling trucks, A, which roll on the top of the upper chords of the swinging frame, while the radius arm B takes hold of the lower end of the raising frame, causing it to move in the arc of a circle as indicated. The ropes C and D over the drum pass around suitable idler sheaves and are anchored to the sliding crosshead E, forming a closed circuit. From this crosshead the raising arms F take hold of the raising frame, transmitting the movement of the crosshead to the latter. The hammer hoist rope, pile hoist rope and steam pipe run up from the car body to the swinging frame through the large hollow hub of the swinging worm wheel. The steam pipe is in the center and the ropes are so close on either side that they work equally well with the leaders in any position with regard to the car body.

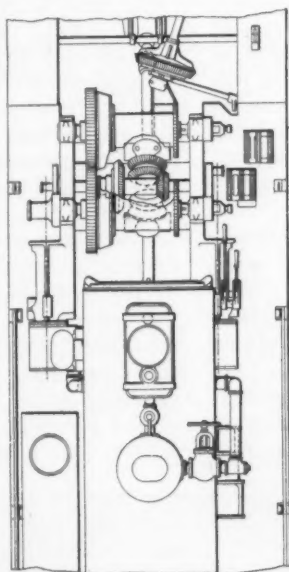
The main engines are 11 x 12 in., with double cylinders and Stephenson link motion. From the crank shaft the two drums for the pile hoist and hammer hoist lines are geared in the usual manner with cone

\* Presented at the annual meeting of the American Society of Mechanical Engineers, New York, December 7-10, 1909.  
† Assistant chief engineer, Bucyrus Company.



friction clutches. The engines, however, are much more powerful than would be required for these drums. The propelling gearing consists of two inclined shafts leading from the crank shaft of the engine to the rear axle of the forward truck and the forward axle of the rear truck. From Fig. 2 it will be seen that each of these shafts carries on its upper end two bevel gears, while the crank shaft carries a sliding sleeve with a small bevel gear on one end and a large one on the other end, the two meshing respectively with the two pairs on the inclined driving shafts. By sliding the sleeve to one end or the other a fast or slow propelling ratio is obtained. With the fast gear, on level or moderate grades and with moderate loads, the machine can readily be driven at 25 miles per hour and has been driven at 30 miles per hour. With the slow gear the engines are powerful enough to slip the two driving axles and thus obtain all the tractive force that can be had with about 80,000 lb. weight on the drivers. The machine can thus be used effectively as a switching engine and will readily haul its own weight with considerable additional load over grades of  $1\frac{1}{2}$  per cent. or more. The acceptance test of the first machine built was a run of 32 miles up a grade averaging 75 ft. to the mile, with a maximum of 97 ft. to the mile.

The lower ends of the inclined propelling shafts shown in Fig. 2 are provided with bevel pinions. These mesh with bevel gears cast in one piece with large sleeves, as shown in Fig. 5. These sleeves surround the driving axles, a cored hole through the middle of the sleeves 10 in. in diameter providing about 2 in. clearance around the axles. The sleeves are supported by brackets rigidly attached to the car body with babbit bearings. All this gearing is fastened to the car body only and remains in line without regard to the swiveling of the trucks. The connection by which the driving torque is communicated from the propelling sleeves to the axles is also shown in Fig. 5. It consists of a modified type of universal joint so arranged that there is nothing to interfere with the axle passing through the middle. The propelling sleeve carries at one end a large flange with lugs supporting two pins, G; these pins engaging with two bronze bushed lugs, H, formed on the inner side of the toggle casting i. On its outer side it carries another pair of lugs, J, on an axis at right angles to the axis of the pins G, and these lugs, J, are connected to a U-shaped driving yoke, K. The open end of this yoke is again pin connected to a bracket, L, which is keyed to the axle. Both pins are made much longer than the lugs which engage them, to permit end play due to the displace-



ments of the axle, as shown on the plan view, Fig. 5. As these two pin axles are at right angles to each other their combined slip will take care of any move-

Fig. 2.—Partial Plan and Side and End Elevations of the Bucyrus Locomotive File Driver.

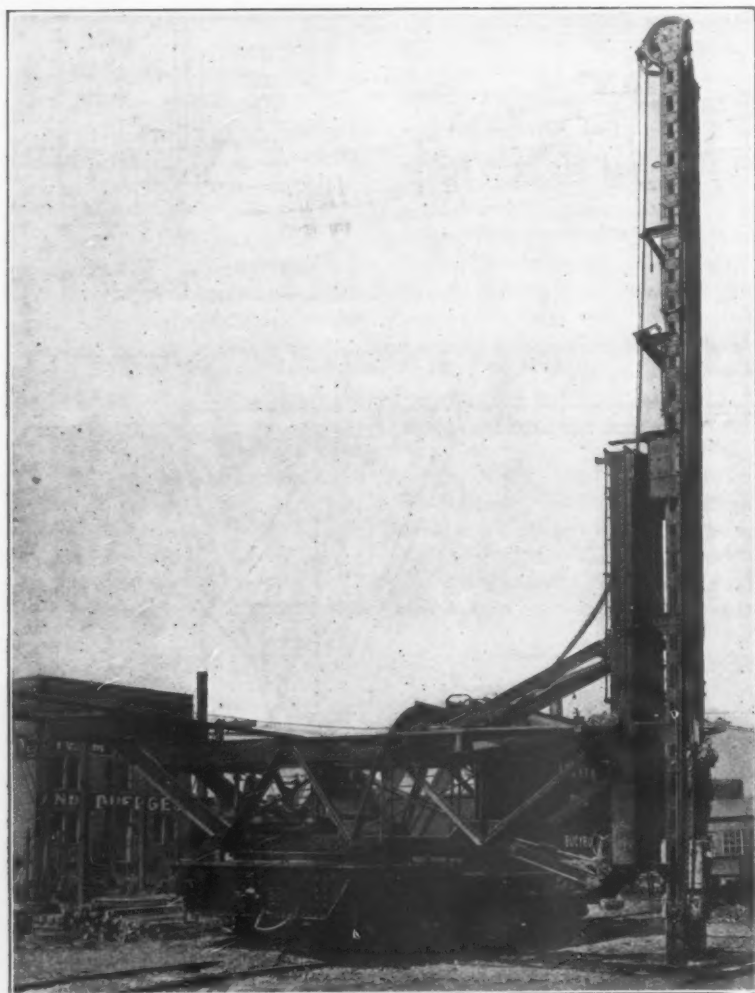


Fig. 3.—The Leaders in Position for Driving, with the Swinging Frame Across the Track.

ment of translation, while the combined revolution of the parts around the pins G, M and N provides for any possible twisting. The wearing parts involved are six steel pins and six bronze bushings, all of the same size, and all parts are so made that the wearing surfaces can be replaced without taking the truck from under the machine.

The method of detaching the driving gears when it is desirable to ship the pile driver in a freight train is slightly indicated in Fig. 2, at the rear axle of the front truck, where an operating lever is shown taking hold of the bearing which supports the bevel pinion at the lower end of the forward driving shaft. This bearing and the pinion are mounted in a sliding support, which enables the pinion to be drawn out of mesh with the bevel gear, permitting the propelling

sleeves and gears shown in Fig. 5 to revolve freely with no gears in mesh. The same arrangement is provided on the rear truck.

The boiler is nearly three times the size of that ordinarily furnished for pile drivers. It is of the locomotive type, 54 in. in diameter, 15 ft. 9 in. long, having about 800 sq. ft. of heating surface and designed for 175 lb. pressure. This pressure is required only on propelling runs; all the ordinary movements can be made with 100 lb. pressure.

One of the striking features of the machine is the hydraulic turntable, which is shown in action in Fig. 4 and in shipping position in Fig. 1. It is frequently very important that a pile driver should be able to turn end for end or else work at either end indifferently. The latter plan requires that the boiler and pile driving machinery shall all be mounted upon a swinging deck, which can be turned through a full circle and reach either end of the car. This has been thoroughly tried and is satisfactory as far as pile driving is concerned, but makes it impossible to get a sufficiently powerful and reliable propelling gear between the engines and the trucks. In the new machine, therefore, the pile driving apparatus is mounted on the car body, where it can work at one end only, thus obtaining the powerful propelling drive already described. To reverse the machine a hydraulic lifting jack is attached underneath the car and under the center of gravity of the entire structure.

This jack consists of two ball race castings having races about 5 ft. in diameter provided with 2-in. steel balls. The upper race is carried upon a set of four bell cranks, two on each side of the car, pivoted upon brackets attached to the main car beams. The upper ends of each pair of bell cranks are connected by a parallel rod, while the rear bell cranks are connected across by a heavy shaft. This arrangement compels all four bell cranks to act in unison, and when operated by the hydraulic cylinders the four pins from which the upper ball race is suspended move up and down the same distance, maintaining the turntable at all times parallel to the car, even though the center of gravity may be quite a distance away from the center of the turntable. The bell cranks are operated by a pair of hydraulic cylinders 12 in. in diameter, having

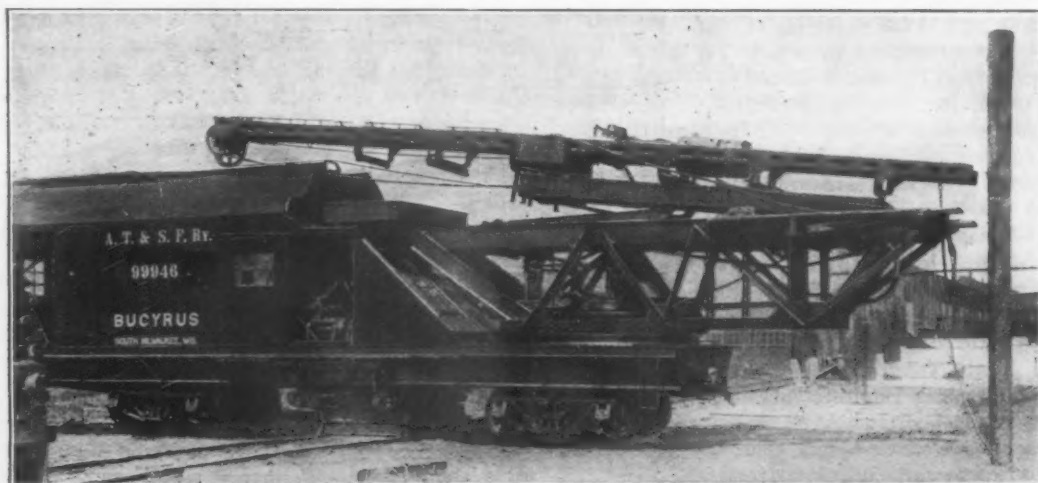


Fig. 4.—The Pile Driver Standing on the Hydraulic Turntable with Both Trucks Off the Ground.



about 28-in. stroke, located one on each side of the car. The cylinders have trunk pistons with sufficient area between the outside of the trunk and the bore of the cylinder to provide lifting force enough to raise the turntable from the track and put it in shipping position. While lifting the car the pressure acts upon the full area of the 12-in. piston. The working pressure of about 200 lb. per square inch is provided by the boiler feed pump. The lower ball race, suspended from the upper ball race by suitable clips, is also provided with a set of chair castings which rest on the rails and can readily be placed under the four jack screws, located in the four corners of the lower ball race. This also carries a circular rack, while the upper one has a transverse shaft with a crank on each end and a double gear reduction to a swinging pinion which meshes with the rack on the lower ball race.

When the machine is to be turned it is necessary only to put the chair castings under the jack screws and run the latter down until they touch the chairs. The entire car is then raised by pumping water into the hydraulic cylinders and turned end for end by hand, two men working on each crank. The entire operation

ooo lb. It is equipped with either a No. 2 steam hammer or a 3500-lb. drop hammer, or both. The leaders are so made that either hammer can be used without change. The reach for driving piles is 18 ft. ahead of the center of the forward wheel, or 19 ft. on each side, while with the turntable 32 ft. on either side can be reached. The leaders are 40 ft. long. The construction is entirely of metal, except the house.

### Gas Producers and Fuel Oil in the Navy.

H. I. Cone, chief of the Bureau of Steam Engineering, Navy Department, makes the following statement in his annual report to the Secretary of the Navy concerning the installation of a producer gas engine plant to determine its adaptability to marine service; also concerning the present use of oil under the boilers of vessels:

The development of large gas engine machinery operated in connection with gas producers is rapidly progressing. The bureau is of the opinion that this prime mover is worthy of much more serious investigation and experiment than has yet been given it in our navy. It is possible to design a marine plant composed of bituminous coal gas producers furnishing power to gas engines. There are several such plants already in existence, although they are small, they prove the feasibility of extending this system of developing power to larger installations. Great possibilities for improving the economical operation of machinery are offered by the producer gas engine combination. We cannot afford to delay development of the gas engine for naval use until commercial gas engine plants, directly adaptable to naval use, are regularly on the market, and it is, therefore, recommended that special authority be secured in the next appropriation act for the diversion of not more than \$250,000 of the appropriation "steam machinery" for the purchase and installation of a producer gas engine plant in one of our colliers, if at any time during the year such an expenditure is deemed advisable.

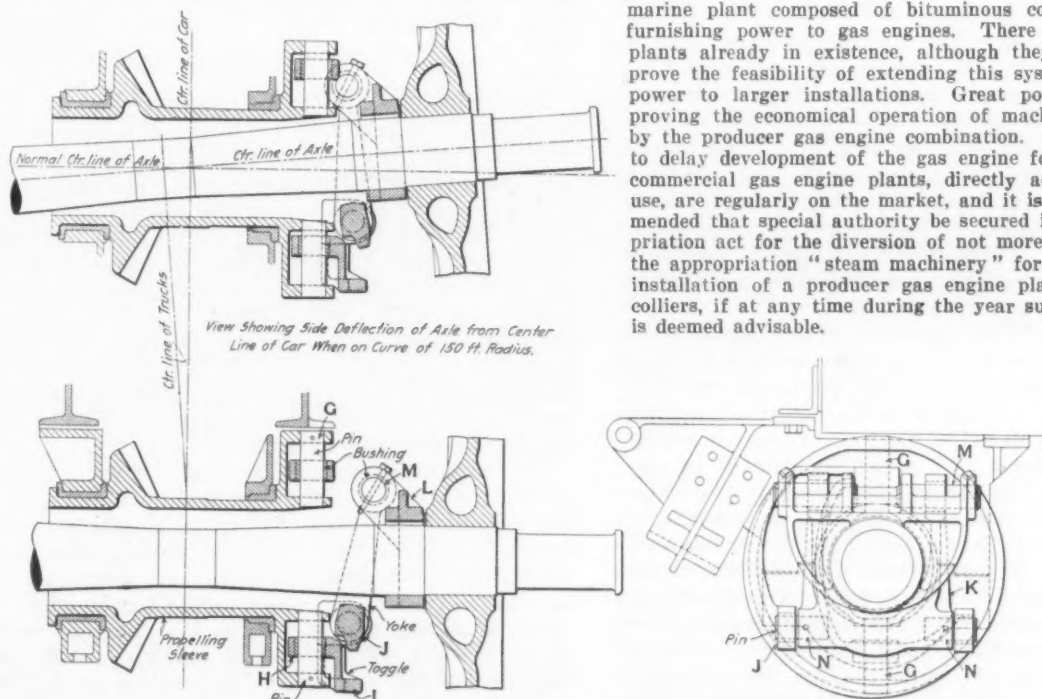


Fig. 5.—Sections and End View of the Universal Joint Between the Propelling Sleeve and the Axle.

occupies from 10 to 15 min. An important incidental advantage of the turntable has already been touched upon. Figs. 3 and 4 show its use to enable the driver to reach a pile at a long distance from the center of the track. In this way, should occasion arise, any point within 32 ft. of the track may be reached and the pile driven.

The first machine was built with slow gear only, having a maximum speed of 15 miles per hour. It has since been in constant use on the western divisions of the Santa Fe and on heavy grades. The fast propelling gear herein described has now been added and two machines thus equipped have been built and shipped. On one of these, for the Canadian Pacific Railway, the following speed test was made. The machine hauled an ordinary passenger car from South Milwaukee to Racine and return, a distance of 12.6 miles each way. The run to Racine was made in 31 min., an average speed of 24.4 miles per hour, 2 miles being made at a speed of 30 miles per hour. The return trip was made in 37 min., making an average speed of 20.5 miles per hour.

The shipping weight of the machine without the turntable, as shown in Fig. 2, is about 147,000 lb.; with the turntable, as shown in Figs. 1, 3 and 4, about 160,-

During the year the installation for burning oil fuel instead of coal under the main boilers of this vessel has been completed. The system used is the Staples & Pfeiffer, in which the oil is atomized by compressed air after having first been passed through heaters. The results obtained have been very satisfactory, and have increased the ability to maintain a constant steam pressure and to develop a high power for long periods without tiring out the personnel. Gratifying as have been the results obtained with this system, it is not the most desirable for use in naval vessels on account of the weight and space required for the necessary air compressors, and also on account of the desirability of having the heavier vessels so fitted that either oil or coal, or both fuels in combination, may be used, as desired, as coal can be obtained everywhere a ship may go, while the ports where oil fuel may be obtained are limited. With this latter consideration in view, the bureau is fitting in later vessels only such oil fuel systems as operate by mechanical atomization of the fuel under high temperatures, the necessary air for combustion being supplied by the regular forced draft blowers of the vessel.

Official announcement of the foundrymen's convention, to be held at Detroit June 7-9, 1910, is made by Dr. Richard Moldenke, secretary of the American Foundrymen's Association, and W. M. Corse, secretary of the American Brass Founders' Association. Hotel headquarters will be at the Pontchartrain.

## Compensation for Accidents.\*

### The Cleveland Foundry Company's Plans Both for Prevention and Relief.

BY F. W. RAMSEY.

In our business we operate a great many stamping presses, which are prolific of injury to the fingers and hands of operatives, and fully 90 per cent. of our accidents occur on these machines. For several years we have averaged nearly 50 accidents per year, ranging from the loss of the tip of a finger to all the fingers of a hand. These machines are operated on the piecework basis, and the monotony of the operation is a contributing cause to the accidents which occur.

About a year ago we set aside one of our best men—a designer of tools and machines—to devise improvements looking toward the elimination of this hazard. His first work was to inspect critically all of the dies used in these presses, with a view to ascertaining what changes could be made in their construction reducing or eliminating the chances for injury. We have been reasonably careful in the construction of our dies, but this special attention developed the fact that in at least 50 cases simple changes could be made in the construction of the dies, which would reduce from 50 to 100 per cent. the hazard to the operator. These involved little or no additional expense in the first cost of the tools, and in no case involved a higher cost of production, but in a number of cases actually reduced the cost of production. The improvement made it possible for the man to work with greater confidence and thus perform the operation more rapidly.

As a result of this work we have designed several new principles—new to us at least—in die construction, which will practically eliminate the chance for injury in many cases. They are in the nature of automatic feeds, sliding and swivel dies, which make it unnecessary for the operator to expose his hands to injury.

Those here familiar with stamping press operations will understand that in many cases the operator exposes his hands both in charging the die and in removing the work. We have learned of the use of compressed air for discharging work from the die, and have installed an air compression plant, which permits of our applying air in a great many cases, for the purpose of removing work from the dies, thus securing at once, in all cases where air may be applied, a saving in the cost of production, which we believe in the course of a year or two will fully reimburse us for the entire expense of installation.

In our die, tool and machine construction we have adopted this policy and have sought to bring all the men of our organization concerned, to the support of it, viz.: "In the construction of dies, tools and machines, our first regard shall be for the safety of the operator. We will not concern ourselves with the question of economy in die construction or in production from the dies, except as economy may be effected without subtracting from the safety of the tools in question." As this policy has been working out, we have been delighted to find that it may be applied without additional cost in tool construction and with actual saving in the production cost from the tools.

#### Removing Unhealthful Conditions in Soldering.

Not only are we finding it profitable to prevent accidents involving injury to our men, but we are finding it profitable to spend money on the improvement of sanitation and ventilation, and all conditions affecting the health of our workmen. We have a striking illustration of this in an experience we are now going through.

In our soldering department the conditions have

been unhealthful for many years. The atmosphere is heavy, constantly with fumes from the contact of hot soldering irons with the acid flux used in soldering. It has always been a problem to keep the force constant in this department. We have been compelled to hire as high as 225 men in a year to keep 75 to 80 men at work. We have been aware that the men were leaving the service because of the unhealthful conditions, but the difficulties seemed insurmountable until, under our new policy, we determined to find a way. After a few weeks of study we are now preparing to install an exhaust system, representing an investment of not to exceed \$1200, that will entirely eliminate the unhealthful conditions. We are confident that this will result in making the force in this department 50 per cent. more constant, which will fully cover the investment, not to mention what is of more importance—the protection to health and the higher efficiency of the men employed.

#### Compensation Plans.

As I have said, nearly all of our accidents occur on stamping presses, and are in the nature of crushed and severed fingers. Amputation is usual in the case of a press accident, and men are incapacitated for a few days or for many weeks, according to the seriousness of the injury.

In the first place, we have engaged a competent surgeon, who looks after all our cases. We place no restriction upon the amount of medical or surgical attention the injured man shall be given. We pay all the expense of such medical or surgical attendance. In the matter of wages, we pay our injured men their full wages for all the time that they are unable to work. We formerly paid injured men their day-work wage while incapacitated, which usually was only 60 to 70 per cent. of their normal piece work wage. This later impressed us as being unfair. Within the last year we have paid the full piece work wage, based on the man's earnings over the previous 30 days, for all the time that he is incapacitated because of the injury.

We require injured men to report for work as soon as they are able to do light work, which will not involve the injured hand—work, for example, which can be done with the one well hand. We usually place these men in our stockroom, where they are constantly before us, and where we cannot escape keeping them in mind, to the end that as soon as able they are placed on work, which will pay them as nearly as possible the wage which they were receiving previous to their injury. We regard our injured men with a great deal of solicitude, and in case the injury permanently impairs a man's earning capacity we feel a definite responsibility for his future and try to provide for it.

#### Compensation for Lost Fingers.

In addition to the above, where an injury to the hand involves three or more phalanges of the fingers of the hand, we feel called upon to make an additional cash settlement, which varies according to the extent of the injury. We sought for a long time to find some fair basis upon which to determine what these cash settlements should be. We had to consider the question of our ability to pay, along with the question of compensation due the man. As a result of our study, we have placed a certain value upon each finger of the hand, subdividing these amounts into values placed upon each of the phalanges of each finger. The total of these, involving all the fingers of the hand, amounts to \$1260. This is the sum we pay for the loss of all five fingers of the hand.

If but two phalanges of a finger are lost, we pay nothing. If more than two, we pay according to the values that we have set upon each phalange. If the entire thumb, for example, is involved, considering this to be the most valuable member of the hand, we pay \$300. If the entire index finger is involved we pay \$285. If the first joint of the first, middle or ring

\* From an address before the National Civic Federation, New York meeting, November, 1909.



finger is involved we pay \$225. We have not been called upon as yet to pay the entire compensation for the loss of all five fingers of the hand, but we have paid \$1000 under this system for the loss of four fingers.

You will understand, of course, that we have not set these amounts against these different members with the idea that they represent or even approximate the value of these members to the man. We have established this plan altogether on the basis of what we believe is the fair and reasonable thing to do, with due consideration to the needs of the man and our ability to meet his needs.

#### As to Men Who Become Ill.

There is one other interesting line of work which we are trying to develop. We have come to feel some measure of responsibility in case of illness of our men, and as a first step have recently made it one of the functions of our labor supervisor to keep track of all men who become ill in our service, with a view to providing what may be necessary in the circumstances. I want to relate two experiences which have done much to bring us face to face with our responsibility in this regard.

We happened to observe, a few months ago, a young man in one of our departments who looked ill. He was pale and emaciated. Upon inquiry we found that his foreman had observed his condition. He had been in our employ for some years, was faithful and competent, but of late had lost time frequently, because of illness, and had been observed to be steadily declining. We interviewed the man and found that he was feeling miserably ill, and, as we expected, was up against home responsibilities which made it impossible for him to see any way out for himself but to keep on working in the hope that he would come through all right. I sent him to our physician, learned that there was nothing organically wrong, but that he was rapidly approaching a complete nervous collapse and would require an immediate change to lighter work, with shorter hours. He was a good clerical man and we brought him into our office and put him on clerical work. He has proved very competent and will be retained in our office service, and has almost completely regained his health.

A year ago we were involved in a really unjustifiable labor difficulty with our polishing and buffing department, affecting some 50 men. It was an extremely expensive fight to both the company and the men, involving thousands of dollars. One of the ringleaders on the side of the strikers, who was chairman of the Strike Committee and president of the local union, was among the men whom we could not avoid taking back. We observed some time ago that he had been out of the service for a period of two or three weeks. Upon making inquiry of his foreman it was learned that he was ill, and the foreman expressed the fear that the man was afflicted with tuberculosis, which is a rather common disease among polishers and buffers. It came to us forcibly that we were under some obligation to assist this man, who had been in our service seven years, engaged at work dangerous to his health. We had him examined by a competent physician and learned beyond any question that he was afflicted with tuberculosis, but that he had a fair chance for recovery. To comply with all the rigid conditions—viz., three months or more of absolute rest, a special diet and a long list of special requirements, which would have been as impossible to this man, without a dollar, in debt, with a wife and child to support and not a relative or friend to assist, as a trip to Europe for his health, we proceeded to do for this man everything that was needful to insure his recovery, and doubtless within three to six months he will be able to make his own way again.

A year ago we were fighting each other, he with a

mistaken notion of us and we with a mistaken notion of him. The other day I received this letter from him, eloquent in its testimony to the supreme merit of a plan that reaches in its helpfulness the need of such a man as this:

MY DEAR FRIEND: I will write you a few lines, leaving you know how I am getting along. I have been here a week to-day and I certainly do feel the change, breathing the fresh air all the time. I was feeling good until to-day. I don't feel my best, as it has been a sultry day, and it made me feel very tired. I started to sleep in my tent Tuesday night. I sleep good all night and get up feeling fine. It took us a couple of days to get settled, but we are living in our own part of the house. I tried to thank you for what you are doing for me in the office, but I could not talk; but you cannot tell my feelings, knowing that it means happiness instead of worry to me, and that I have a chance to get cured.

From a purely financial side we consider this type of welfare work tremendously worth while, for at the expenditure of a few hundred dollars at the most we have not only, in all probability, saved the life of a man, but have won, by fair dealing, the everlasting loyalty of the man and his friends in our employ, and have carried our business a long way from the possibility of disastrous labor difficulties. And while these considerations of material benefit to ourselves are not the worthiest motive behind this sort of effort, these benefits must follow in the wake of such a policy, if it needs justification on this basis.

#### Increasing Average Size of Iron Ore Cargoes.

Figures made up from year to year by the Duluth, Mesaba & Northern Railroad show how the average size of iron ore cargoes leaving its docks at Duluth, Minn., has increased. The statement is as follows:

Year.	Gross tons.	Year.	Gross tons.
1895.....	1,809	1903.....	5,668
1896.....	2,214	1904.....	5,670
1897.....	3,541	1905.....	6,037
1898.....	3,350	1906.....	6,793
1899.....	3,803	1907.....	7,516
1900.....	3,783	1908.....	8,325
1901.....	4,459	1909.....	7,777
1902.....	4,814		

The greater size of the average of 1908 cargoes is due to the fact that in that year of depression only the largest vessels could be profitably operated.

**The Enameling of Cast Iron Articles.**—Many manufacturers have difficulty in ascertaining where to get their castings coated or enameled with porcelain enamel. It often occurs that certain products or parts of machinery should be coated or enameled with some character of enamel such as is used on bathtubs, so as to obtain best results possible. While a great number of concerns do job work in the wet coat process, such as is used on kitchen utensils, enameling signs, &c., this enameling is comparatively thin and is not as durable, heavy or sanitary as that used on tubs, lavatories and sinks. Owing to the fact that the Humphries Mfg. Company, Mansfield, Ohio, is a large manufacturer of porcelain enameled iron sanitary ware, it has received numerous inquiries for special porcelain enameled iron castings, and some time ago it established a department in order to take care of the work of this character in a satisfactory manner.

The Delaware River Steel Company, Chester, Pa., which recently purchased the Tidewater Steel Company's plant, expects to get its furnace in operation January 15, blowing in, in all probability, on basic iron. The company will use by-product coke as fuel. Heavy shipments of both foreign and domestic ore are being received. The regular meeting of the company will be held January 11, when directors and officers to serve the ensuing year will be elected.



### The Avery Company's Large Addition.

The Avery Company, Peoria, Ill., will erect in the near future an addition to its main factory at an approximate cost, when completed and equipped, of \$200,000. The main building will be 93 x 700 ft., with a wing 150 ft. in length extending to the Rock Island tracks.

These shops will be built of steel, brick or concrete, and will be of fireproof construction throughout. The new structure will have a central bay 700 ft. long

### The Norton Camshaft Grinder.

The camshaft of an automobile or marine engine is an all essential factor. Its cams, differing in angle one from another, must be exact of form and exact of angle. The desirability of having them made in one piece with their shaft is evident. For grinding the cam forms on a camshaft the Norton Grinding Company, Worcester, Mass., has developed an attachment to be used on its standard type of machine.

The fixture, as may be seen in Fig. 1, is fastened on

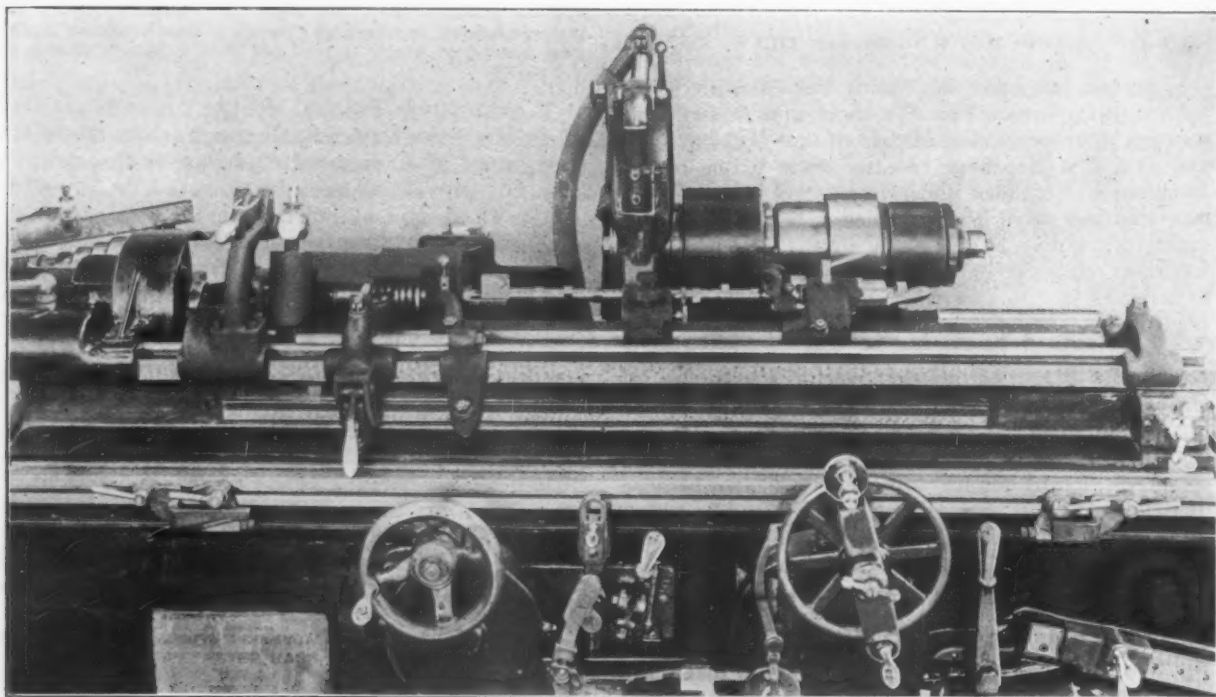


Fig. 1.—Internal Cam Grinding Attachment, Front View.

by 40 ft. wide, and two side bays 24 ft. wide with a gallery over each side bay. The central bay will be 39 ft. high, the crane rails to be 32 ft. above the floor. A wing 150 ft. by 80 ft. will be connected to the main building. This addition will be a stock room, a railroad switch to run through the lower end. The central bay is to have runways for two electric cranes, one 20-ton with a 5-ton auxiliary hoist, and one 10-ton. The stock room wing will have a 20-ton crane. The central bay will be for engine erecting and heavy machine tools. One side bay and gallery will be the machine, fitting and metal shops; the other bay will be engine erecting and wheel shops, and the stock room for finished parts in the gallery. The erecting bay is to be equipped with 15 hand cranes, a crane for each erecting floor.

This new addition will help out the much crowded condition of the present plant. The company intends to separate the steam and gasoline engine work from the separator and small goods, and decided to build this addition for engine work only, leaving the present shops for separator and small goods. The new building will be well lighted; the sides of each bay will have as much window space as can be crowded in. Along the sides of the monitor, formed by the placing of the roof of the middle bay above that of the side bays, will be two continuous rows of windows that will aid very much in lighting the middle bay. The aim of the company is to have both a well lighted and well ventilated shop. The plans are being rushed and the company hopes that about January 10 it will be prepared to ask bids for the full or separate contracts as may be deemed advisable. It is hoped to have the shops completed, ready to install tools, by May 1.

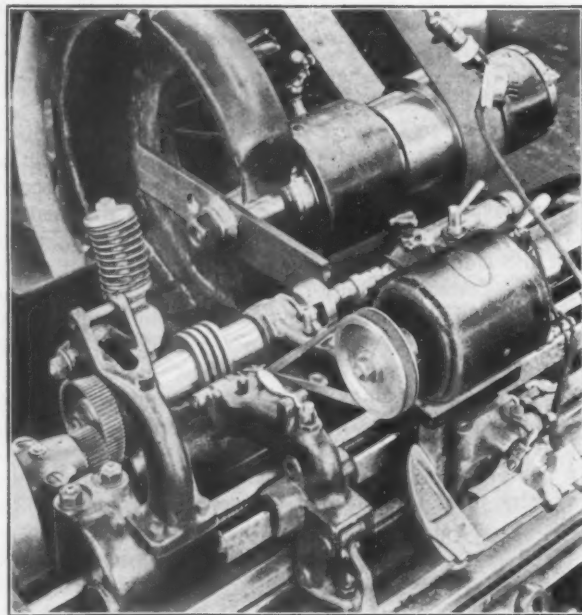


Fig. 2.—Norton Camshaft Grinder Arranged for Grinding Master Cams.

the machine in the same manner as the head and tail-stock and is arranged to have a rocking motion, that the line of the cam form may be followed in the grinding. The work is mounted on centers and is held by a special dogging device, the dog being held tight between two pins on a face plate. The end of the work is splined and keyed into the dog, so that exact alignment is maintained until the last operation, the grinding of the last cam, is completed. Upon the shaft of

the attachment, in which is the head center, is mounted a group of master cams, corresponding in number and form and angle to the cams to be ground. This shaft is driven by gears from the main driving plate of the machine. Fastened to the table, like a back rest, is a bracket which carries a rod upon which slides a roll carrier. The rod is drilled to receive a pin in the roll carrier, there being a pin position to bring the roll opposite each of the master cams. The cam is

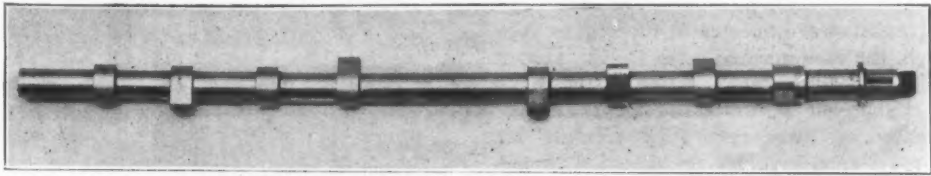


Fig. 3.—A Solid Camshaft Ground in the Camshaft Grinder.

held against the roll by spring pressure. This is accomplished by a spring plunger, consisting of a heavy casing with a plunger backed by a powerful spring, which is always acting to keep the master cam in full

The Navy Department Favors the Delaware.

The official figures of the Bureau of Steam Engineering give the battleship Delaware a greater steaming radius than the North Dakota. These are the two dreadnoughts recently tested. The Delaware has reciprocating engines and was built by the Newport News Shipbuilding & Dry Dock Company, while the North Dakota is fitted with Curtis turbines and was

built by the Fore River Shipbuilding Company. The bureau has made the following calculations on the water consumption at 12, 19 and 21 knot speeds, which we take from the New York Herald:

DELAWARE.			
Water per indicated horsepower per hour, main engines only...	12 knots. 15.48 lb.	19 knots. 12.7 lb.	21 knots speed. 12.9 lb. water.
Water per indicated horsepower per hour, all purposes.....	12.24 knots. 21.03 lb.	10.225 knots. 14.52 lb.	21.563 knots speed. 14.8 lb. water.
Total water per hour, all purposes.....	12.24 knots. 83,463 lb.	19.225 knots. 250,540 lb.	21.563 knots speed. 422,931 lb. water.
Total water per hour for main engines only.....	12 knots. 55,000 lb.	19 knots. 205,000 lb.	21 knots speed. 312,000 lb. water.
NORTH DAKOTA.			
Water per shaft horsepower per hour, main turbines only....	12 knots. 20.6 lb.	19 knots. 14.25 lb.	21 knots speed. 13.8 lb. water.
Water per shaft horsepower per hour, main turbines and engines' auxiliaries.....	12.1 knots. 23.94 lb.	19.245 knots. 15.92 lb.	21.64 knots speed. 14.408 lb. water.
Total water per hour, main turbines and engines' auxiliaries..	12.086 knots. 90,984 lb.	19.245 knots. 266,761.1 lb.	21.64 knots speed. 450,965 lb. water.
Total water per hour for main turbines only.....	12 knots. 76,000 lb.	19 knots. 238,000 lb.	21 knots speed. 349,000 lb. water.

contact with the roller. As the roller is fixed in position the camshaft is constrained to oscillate as it rotates in definite relation to the form of the master cam. In doing the work the roll is pinned in position against the first master cam, and the grinding continues until the first cam of the work has been finished. The roller then passes to its second position and the second cam to the grinding wheel, and so on until the shaft is completed.

The master cams themselves are produced in much the same manner, a model cam being used to give the required form. The group of blanks is mounted in the attachment, as shown in Fig. 2. A stationary steel arc of the same radius as the grinding wheel takes its place and is maintained in contact with the model cam which for the time being is the master. Spring pressure is applied to accomplish this function, but the plunger is arranged to act in the reverse direction. The grinding of the master cam blanks is done by a small wheel mounted in a fixture. This wheel takes the place of the roll and is in the same relative position that the roll occupies to the master cams during the grinding of camshafts, and in the final operation is sized to micrometer to the exact size that the roll will be. Consequently the conditions attending the grinding of the master cams are identical with those which exist when these cams are employed in commercial work, and a corresponding degree of reliance may be placed upon the accuracy of the product. Fig. 3 shows a typical solid camshaft ground with this attachment.

H. F. J. Porter, 1 Madison avenue, New York, has issued a card calling attention to the principal features of modern industrial management to which he gives special attention as consulting industrial engineer. These cover examination and reports, general organization, office methods and business policy, factory design, factory organization and supervision and labor efficiency betterments.

From these figures the comparative coal consumption can be deduced, as about 8 lb. of water are consumed to 1 lb. of coal.

It is declared that the Delaware was the more economical of the two ships at all speeds. Comparing the total water consumed per hour by the main engines of the Delaware with the total water supply consumed per hour for the main turbines of the North Dakota, it is found that at 12 knots the Delaware consumed 55,000 lb. of water, against 76,000 for the North Dakota; at 19 knots, 205,000 lb., against 238,000, and at 21 knots (contract speed), 312,000 lb., against 349,000.

It is roughly estimated that the North Dakota can steam about 5000 knots without replenishing her coal bunkers, while the Delaware can go about 6000 knots.

**The Mount Union Silica Brick Company.**—The Mount Union Times, Mount Union, Huntingdon County, Pa., in its issue for December 14 gives an interesting account of the development of the business of the Mount Union Silica Brick Company. This company has extended its operations in the past eight years from a plant producing about 4,000,000 brick a year to its present capacity of 25,000,000 per year, or over 80,000 per day. The first brick was made by this company November 27, 1901. It now has 18 kilns, all of the modern improved type, and is building an important addition to the plant. It uses daily 250 tons of rock and about 100 tons of coal. In addition to the deposit now being worked, the company owns ten miles of ganister rock along the Tuscarora Mountain, with other holdings, which assure an inexhaustible quantity of the necessary raw material. The plant includes a well equipped machine shop and repair shops. Scott Dibert, Johnstown, Pa., is president of the company; Francis J. Torrance, Pittsburgh, is vice-president; Herman E. Baumer, Johnstown, is secretary and treasurer; T. N. Kurtz, Mount Union, is general superintendent.

## Piping and Segregation in Steel Ingots.\*

### Studies in Rail Steel by the New York Central Lines.

BY P. H. DUDLEY, NEW YORK.

My observation during many years of practice in teeming steel ingots has been that piping or shrinkage cavities and segregation are greater in the higher carbon steels than in the medium and mild steels. Hence we are obliged to discard a larger portion of the ingot of sound high carbon metal, especially as its dimensions are increased. The necessity of teeming all kinds and grades of steel involves the question of the greatest percentage of sound or available metal free from pipes and sponginess, whether of crucible, Bessemer, open hearth or electric manufacture, which can be used for the purposes intended. This question requires renewed investigation, in order that we may secure a better and higher grade of steel, as the metal is subjected to more severe service in the rapid progress of the industrial arts.

Many members of the institute can recall the rapid failure of the iron rails from 1860 to 1865, when the driving wheel loads of the engines reached from 10,000 to 12,000 lb. The physical properties of wrought iron, with its 1 to 1.5 per cent. of included cinder, had been sufficient for the evolution of the railroads, but proved inadequate for their subsequent development. The substitution in 1865 of light Bessemer steel sections for iron rails was facilitated by the fact that the steel, having been once molten in manufacture, would be more homogeneous than iron.

All of the early Bessemer rails were rolled from ingots which, after being teemed and "stripped in the pits," were allowed to cool for examination, as in crucible practice, to see whether they were suitable for rails. The ingots selected were reheated and hammered into blooms, and many cases of genuine piped rails with smooth unwelded walls of the web, from cold shrinkage cavities, were subsequently found in the tracks.

#### Early Steps to Prevent Cavities.

In the winter of 1876-77 I was sent to investigate a number of piped rails which had split in the web and broken in the track. In a few cases I found slag between the walls, but in most cases the walls were oxidized. I went also to the mill in which the rails were made and found ingots which had been allowed to cool, of which 80 per cent. were piped at one or both ends. This fact, in connection with some forcible language by the general manager of the mill, in answer to my question whether this was an extraordinary percentage or the usual amount of piped blooms, made a lasting impression on my mind. I concluded that the cavities represented the interior volume of shrinkage from the molten metal of teeming to the cold metal of the ingot walls, and that the greater part of it could be avoided in rail ingots by charging them into the reheating furnace as soon as possible after they were stripped. This method soon became the regular practice at all rail mills, and the percentage of piped rails from shrinkage cavities was reduced. Professor Howe does not give this feature of the "state of the art."

I have always worked upon the plan of checking the full amount of the interior shrinkage of the volume of the steel in the ingots for rails by prompt reheating after stripping, in connection with the chemical composition required for the physical properties and degree of deoxidation desired for the grade of steel made.

\* Discussion of a paper by Prof. H. M. Howe before the American Institute of Mining Engineers. From the *Bulletin* of the institute for December.

#### A Record of Practically Pipeless Rails.

The adjustment of the chemical composition, first, to secure the proper physical properties, and, secondly, to obtain as sound ingots as practicable under the existing conditions of manufacture, was coincident with my design and use of heavy sections. I did not expect good results in manufacture unless I made proper provision to secure them; and the freedom from piped rails in more than 500,000 tons, which I made from 1891 to 1897 inclusive, is evidence to me that the theory

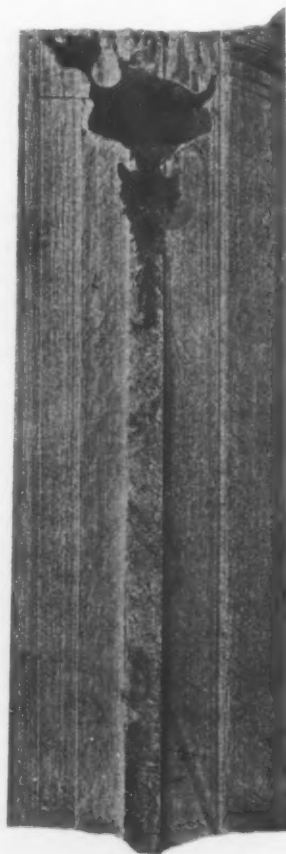


Fig. 1.—Section of Ingot, 17 In. Square at Top, 19 In. Square at Base and 50.5 In. Long, Containing Cavity of 128 Cu. In.



Fig. 2.—Bloom from an Ingot of Same Heat and of Same Size as Fig. 1, Showing Reduction of Cavity.

upon which I worked had basis of fact. I can now control my chemical composition for the section and size of ingot, and with proper time for the teeming, stripping and charging into the reheating furnaces can secure practically pipeless rails. My statements refer to rail ingots, and to secure the desired results my specifications are not universal, but have always had an adaptability to meet local conditions of manufacture at different mills.

In teeming ingots for basic open hearth rails the steel does not, as a rule, set "dead," as it does in Bessemer practice, but the escaping gases eject sparks and the metal rises in the molds. A cast iron plate is often placed on the top of the steel, and in some mills the top of the mold is capped and keyed. Aluminum is often used on top of the metal in the molds to quiet basic open hearth steel for plates as well as for rails. Bessemer steel of from 0.10 to 0.30 per cent. of carbon for billets, splice bars and bolts is often teemed in bottle mouthed molds which are not completely filled but are capped and keyed to prevent the rising metal from overflowing the molds before it freezes. In teeming the ingots of the various kinds and grades of steel there are distinctive methods of practice, which have been evolved after years of experience in producing the several grades of steel required in service.



**Cold Ingots Not a Criterion.**

Professor Howe, studying the shrinkage cavities or pipes from cold ingots in which the entire shrinkage of the metal from the teeming temperature to that of cold steel has occurred, of course finds conditions of manufacture which require attention and correction. Operating men at the mills and engineers have also studied the obstacles to be overcome and applied remedies with such success that the conditions are decidedly better than they would seem to be from a study of the cold ingots. There is still much to be done in the way of improvement and progress, which will continue as long as steel is made and teemed into ingots. A method has not yet been discovered by which an ingot can be teemed, its non-piping period checked or prolonged at one stage of the process, and then the ingot cooled so as to retain what had been gained, as though the entire manufacture, as far as the metal was concerned, had been completed before the steel cooled. A good estimate of the effectiveness of a method of checking the shrinkage volume can be made thus: Take an ingot from a heat, allow it to cool and then cut and measure its cavity. Then take a bloom crop, the discard from an ingot of the same heat, and cut it. In good practice the shrinkage cavity will be but a small



Fig. 3.—Ingot of Same Section as Fig. 1 and 53.5 In. Long. Containing Cavity of 250 Cu. In.



Fig. 4.—Bloom from an Ingot Similar to Fig. 3.

percentage of that found in the cold ingot and will indicate the reduction secured.

**Cavities in Ingots and Blooms Compared.**

Fig. 1 is from a photograph of a three-rail ingot for 100-lb. rails teemed in a mold 19 in. square on the base, 17 in. square on the top and 66 in. long. The ingot, poured 50.5 in. long, was well deoxidized and therefore had a large cavity. The ingot had a volume of 7.4 cu. ft., inclosing a shrinkage cavity of about 128 cu. in., practically 1 per cent. of its volume. This is a larger percentage than would be found in rail steel not so well deoxidized or which contained numerous blow-holes.

Fig. 2 is from a photograph of the bloom of an

ingot of the same heat and length, cut for the 9 per cent. mill discard. The ingot, after stripping and a subsequent ride of 500 ft., was charged directly into the reheating furnace without allowing the temperature to fall below the recalescence point, while the bulk of the steel was several hundred degrees above, and in about 2 hours the ingot was drawn and bloomed. The cavity was small and less than one-tenth of that of the cold ingot of the same heat. I have had a number of ingots and crops cut in recent years, since large planers have been available in the machine shops. In former years I was obliged to rely upon ingots broken as "stickers" at the drop for a view of the shrinkage cavities in those for rails. Professor Howe did not mention this advance in practice from the early days of Bessemer, nor have I seen it reported by other authorities.

Fig. 3 is from a photograph of an ingot teemed in a similar mold, but poured 53.5 in. long for a 19 per cent. discard, and of a still greater degree of deoxidation than the steel in the ingot shown in Fig. 1. The ingot was slightly inclined when the photograph was taken and the top does not show apparently as large as in Fig. 1, but it is of practically the same size. The shrinkage cavity amounted to 250 cu. in., or 1.4 per cent. of the volume of the ingot. The cavity is not bell shaped or with sides showing parabolic curves, but nearly vertical, by reason of the jolting in the ride to the stripping machines, then to the scales to be weighed, then to the reheating furnaces holding the other ingots, then 1000 ft. further to the gantry crane, where it was cooled. It is important to observe that even after its arrival at the gantry the interior was molten under the bottom of the cup shaped cavity and a decided shrinkage of the metal occurred below, the walls being lined with pinetree crystals. The full length of the 19 per cent. bloom crop could not be cut at one shearing but required two cuts; therefore a full bloom crop was not obtained for cutting and subsequent photographing. The cavity was slightly larger than that shown in Fig. 2, though in the bloom it was completely removed in the percentage of discard, and less discard would have answered.

Fig. 4 is from a crop which, by reason of greater deoxidation, is quite similar to one cut from an ingot having the full percentage increased cavity.

The freezing of the steel for my rails commences on the stool and sides of the molds after a few seconds of contact, and bridges over the top of the ingot in 2 or 3 min. after pouring ceases. Interesting phenomena occur in from 3.5 to 4 min. from the end of pouring, through the expansion of the molds from the sides of the ingot of 1-32 to 1-16 in. This expansion continues until the ingots are stripped in the usual time of manufacture. The exterior of the molds, which measure from 27.5 to 29.5 in. over all, will increase after teeming from  $\frac{1}{4}$  to  $\frac{3}{8}$  in. per side.

The deoxidizers used seem to make a difference in the quick freezing of the steel, and must be understood and adapted to the practice of the mill in checking the shrinkage cavities. Aluminum thrown into the molds during teeming, even in small percentages, will often cause the ingot to pipe deeply, while in other cases the pipe will be separated by solid metal into two or more parts. Some of the badly piped rails which developed in the track during the past two or three years, after about that period of service, were those in which the manufacturers had used aluminum to make "wild" steel set "dead" in the molds without reducing the amount of the other deoxidizers specified by the purchaser. It gives a quicker setting steel of greater viscosity and apparent shrinkage, which must be stripped and charged into the reheating furnaces in less time after teeming than the same grade of steel without the aluminum, in order to avoid large shrinkage cavities. In a number of experimental tests made to study the increased shrinkage it was only with extreme care

that it was possible to avoid piping in ingot molds of the size mentioned when poured 61 in. long for four 33-ft. lengths of 100-lb. rails. I was then dealing with from 1.2 to 1.5 per cent. interior shrinkage of the volume of the steel, had the ingot been permitted completely to cool. The time of the nonshrinkage or piping period was so reduced that it was not sufficient to avoid piping some of the "A" or top rails of the ingots by the usual conditions of practice which were effectual in holding under sufficient control the shrinkage of ingots for three 33-ft. lengths of 100-lb. rails in the same molds.

#### True Pipes and Split Heads.

The special tests mentioned were made to study the distinction between true piped rails and split heads, reported by the trackmen as piped rails, and not as easily detected in the manufacture. My investigations show, I think, that the majority of the split heads with which I have had to deal in the track have occurred in the central core of segregated metal in the heads and webs of the rails. The central core is capped in the bearing surface by a layer of metal rolled from the exterior of the ingot and often containing slag inclusions. The heads of these rails as manufactured are solid and cut solid by the saws; the inspectors at the mills pass them as sound rails, which they are to all ordinary observation. Laid in the track the metal in the bearing surface of one or more portions in the length of the rail is inadequate to sustain and distribute the wheel loads without spreading. Although this takes place only to an infinitesimal amount for each passing wheel, the increment is cumulative and the rail head is deformed and eventually splits after one or more years' service. Etching the top crop would indicate segregation and often but not always shows streaks of cast iron cut out of the stool by the hot stream of metal in teeming the ingot. This infusion of cast iron I have found in most of the split heads which have been investigated in full detail, and is the disturbing factor in many cases of decided segregation. I have found the streaks in a 0.50 per cent. carbon rail to range as high as from 0.80 to 1.02 per cent. of carbon by combustion, though from 10 to 15 points lower by the color test. The absence or presence in the rail steel of carbon streaks from cast iron cut out from the stools or molds has been a disturbing element in studying segregation from the analysis of drillings from different parts of the ingot. It is not uncommon to see in a double stool of an ingot car that under one mold only a trace of cast iron has been burned from the stool, while from 30 to 40 lb. has been removed from the other and distributed in the steel of some of the ingots.

The decided segregations when they form part of the head with the cast iron infusions are often unable to sustain the traffic until the rail is removed for wear, but fail by detailed fractures as a split head, as already described. When the segregated portion forms the lower part of the web and base, breakages or detailed fractures of the rail as a girder often occur.

#### Expansion of Ingot Walls.

I have related briefly some of my observations and practice of many years' experience in the manufacture of heavy and stiff sections of rails. Since the publication of Professor Howe's paper I have tried to confirm his theory of virtual expansion of the walls of the ingot by measurements. Professor Howe in his paper says: "If, for instance, on reaching a temperature of 1000 degrees C. the virtual expansion were such that the ingot was 1 in. wider," etc. I did not expect in rail ingots to find an increase of any such amount which for the ingots 19 in. square on the base would augment them to 20 in. square, an increase of 39 cu. in. for each inch in length of the ingot, and for those 50 in. in length of 1950 cu. in., a volume from 8 to 10 times greater than the cavities found in the ingots cut,

which were well deoxidized. Calipering hot molds and ingots as soon as stripped was attended with so many variations of temperature of the molds and ingots that approximate measurements did not definitely indicate an expansion of the ingot walls. Though all of the molds were made from the same drawings, and were alike for manufacturing purposes, yet each was of a different size, and each was again modified by its temperature when the ingots were teemed. The cold ingots from the same class of molds also varied as to precise size.

In open hearth ingots showing ejections of sparks and boiling of the steel against the sides of the molds, the metal often rises 3 or 4 in. and "reams in" before it sets on top. This is a virtual rising of the metal on the top of the ingot, producing spongy steel, and sometimes a cavity is formed when the ingots cannot be charged promptly after stripping. The contraction of solid steel above the critical points is at a faster rate than below. To cut a 33-ft. 100-lb. rail, the saws are set (for rolling at 1000 degrees C.) at 33 ft. 6.75 in. Calculate the contraction from figures obtained below the critical points, and it is only about one-half of the above amount. The roll designer in making a hot template allows a contraction of 3-16 in. per foot.

Molten to frozen steel, when well deoxidized, seems to have a still higher rate of shrinkage as affecting the respective volumes, and it is important to control the temperature lag as much as possible in teeming and reducing ingots to solid merchantable forms. Much can be effectively done in a practical way. During the past year one steel company, for its rail ingots as soon as teemed through a 1½-in. nozzle, throws on the top of the steel a shovelful of from 3.5 to 4 lb. of coke dust, which ignites, keeps the molten steel fluid in the center of the top of the ingot and feeds the shrinkage cavity. Watching the tops of those ingots for 10 or 12 min. I was never able to see a sudden lowering of the molten steel, as would occur in case of a rapid virtual expansion of the walls of the ingot. Those ingots were stripped in from 30 to 35 min. after teeming.

There has been more attention paid to producing better ingots for rails in the past two years than previously, in the great demand for quantity. The changes in rail sections by the railroads did not improve the quality or blooming of the ingots. Sinkheads have been tried experimentally and the shrinkage cavity reduced. Bottom pouring for open hearth ingots has been introduced with decided success and is promised for rail ingots in a short time.

The principle of making Bessemer steel for quality instead of for quantity was required for all 1908-9 rails on the New York Central lines—a return to former practice, the beneficial results of which are already apparent.

The Ontario & Western Railroad Company is perfecting a connection, through its Keyser Valley branch, with the Lehigh Valley Railroad Company at Wilkes-Barre, Pa. This will enable the company to make arrangements for the delivery of iron ore to the Bethlehem Steel Company. The Ontario & Western Company has mineral deposits in Oneida County, N. Y., which will thus be rendered available. It is expected that the ore mines will be developed to their greatest possible capacity in the expectation that the entire output will be shipped to South Bethlehem.

The Griswold Company, Sterling, Ill., has opened a warehouse at 1222 West Eleventh street, Kansas City, Mo. (post office address, Station A). It will carry a full line of its products, consisting of woven wire fence, poultry and garden fence, cross head and single loop bale ties, telephone and plain wire, barbed wire, wire nails, lawn and farm gates, &c. The new branch is in charge of R. G. Crawford.

## The Corrosion of Copper and Brass.\*

### Causes of the Pitting of Tubes and the Deterioration of Sheets.

BY E. L. RHEAD.

The corrosion of copper and its alloys, more particularly during recent years, has been forced upon the notice of metallurgists and engineers by the many instances of failure of these metals when subject to conditions under which previously they had been found to be sufficiently resistant. A few of the more common cases in which corrosion occurs are the following:

### Corrosion of Condenser Tubes.

In condenser tubes the corrosion results in the formation of (1) longitudinal grooves, (2) pitting and perforation of the tube, and (3) the formation of plugs of spongy copper, in addition to the more or less uniform reduction in thickness that gradually takes place in tubes that behave satisfactorily.

Rapid failure of condenser tubes is generally accompanied by deep local pitting. Those that last for long periods show more or less uniform corrosion. In Muntz metal and other similar alloys used as sheathing, tube plates, &c., the corrosion may extend inward from the surface, though not equally from every part, till the whole mass is completely changed. The residue is brittle, breaks with a dull fracture, but yields a bright surface when filed. In other cases where rapid



Fig. 1.—Hard Brass, Magnified 50 Diameters.

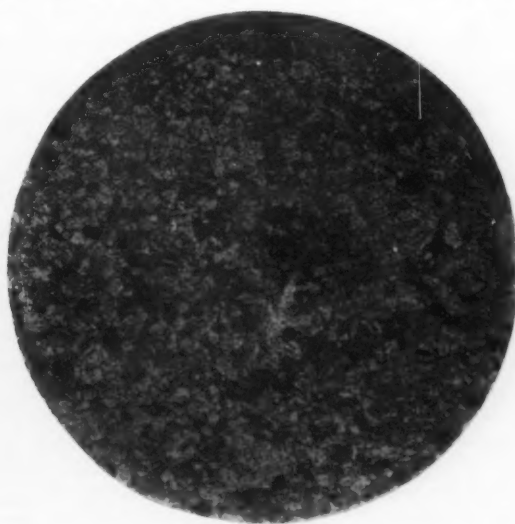


Fig. 3.—Annealed Brass, Magnified 50 Diameters.



Fig. 2.—Hard Brass, Magnified 120 Diameters.



Fig. 4.—Annealed Brass, Magnified 120 Diameters.

1. The corrosion and pitting of the tubes of surface condensers, more particularly those using sea and estuarine waters for condensing purposes.

2. The decay of Muntz metal sheathing, bolts and the underwater fittings of ships.

3. The deterioration of brazing alloy in copper pipes.

4. The corrosion of steamship propellers.

5. The corrosion of the interior of locomotive boiler tubes.

6. The rapid corrosion of copper sometimes noted on articles built up from sheet copper and subject to the action of fire gases.

circulation effectually removes the products, general wastage accompanied by pitting may occur.

The corrosion of locomotive tubes generally results in the scaling of the tube, with more or less roughening of the interior. This in some cases takes place rapidly. The deposit contains oxide and chloride of copper in large amounts, in addition to smaller quantities of sulphate. In one instance the author found 43 per cent. copper, 18 per cent. zinc and 1.87 per cent. sulphur present in the deposit removed from the tube.

The following analyses, quoted from a paper by J. T. Milton before the Institution of Civil Engineers, show the composition of the sound and deteriorated portions of a tube plate and diaphragm plate of a condenser:

\* From a paper read at the Manchester, England, meeting of the Institute of Metals, October 15, 1909.



	Copper. Per cent.	Zinc. Per cent.	Iron. Per cent.	Tin. Per cent.	Lead. Per cent.
Tube plate, sound portion.....	59.07	39.07	1.01	0.22	0.63
Tube plate, corroded portion.....	82.17	17.26	0.22	0.31	0.04
Diaphragm plate, sound portion.....	61.48	38.28	0.08	trace	0.16
Diaphragm plate, corroded portion.....	69.87	29.85	0.12	trace	0.16

showing an increase of 8 and 23 per cent. of copper respectively.

The suggestions put forward in explanation of this peculiar behavior are based on:

1. Selective chemical action.
2. Corrosion resulting from chemical action set up or promoted by the electrical conditions resulting from the presence side by side in the alloy of different components containing the constituents of the alloy in varying proportions, or from the presence of included impurities.
3. The effect of vagrant electric currents escaping from the electrical equipment.

#### Experiment with Hard and Soft Copper.

With a view to contributing to a solution of the difficulty, the following experiments were carried out: Samples of hard and soft copper and brass were submitted to corrosion. The rate of solution in salt water is slow and permits, during the lapse of time necessary to produce a sensible effect, considerable secondary changes. In consequence corroding solutions of a more active nature were used. In one set of experiments solutions of ferric chloride of 1 and 2 per cent. strength were employed. The salt used was the ordinary commercial article, showing a slightly acid reaction. The plates were of 26 gauge, with an exposed surface of 36 sq. in. They were completely immersed in the solution. The amounts of metal dissolved were in the following proportions:

No. of experi- ment.	Solution used.	No. of hours.	Hard copper.	Soft copper.	Brass.
1	1 per cent. ferric chloride.....	20	51	19	49
2	2 per cent. ferric chloride.....	20	151	88	81
3	2 per cent. ferric chloride.....	20	100	90	86
4	2 per cent. ferric chloride.....	48	187	147	133

The plates on removal from the liquid presented a bluish black appearance. The film was evidently cuprous chloride, for on exposure it became green and could be washed away. It was completely soluble in hydrochloric acid, and this was used to remove it. In removing the film from the hard copper, a series of parallel bands developed in the direction of the length. It might be that these bands represent regions of unequal hardness resulting from unequal pressures during cold rolling, which, being unequally acted on, were coated with different thicknesses of deposit.

The brass plates, one side of which was polished, showed copper enrichment round the cut edges, and on the polished side. The tendency for the formation of a copper deposit on the polished side and on scratched portions was very marked.

Plates were prepared in which parallel grooves were made by ruling with a tool which also scratched the surface of the brass. These were placed in ferric chloride solution and treated as before. Similar copper deposits occurred in the grooves. Copper enrichment took place on those portions of the metal disturbed by cutting (the edges) and by the action of the tool.

#### Corrosion of Copper in Various Agents.

Below are given the results of a series of experiments on the corrosion of copper in various agents. Plates of soft and hard copper, and of copper with one surface polished, were exposed in groups of three of the action of saline solutions made up as follows:

1. Hydrochloric acid (a 7.5 per cent. solution).
2. A solution of common salt (15 per cent. solution).

3. Common salt, through which a stream of carbonic acid gas was passed.

4. Common salt, with an addition of 1 per cent. of ammonium nitrite.

5. As in 4, but with a stream of carbonic acid gas passing through.

6. Common salt, with an addition of 1 per cent. of 20-volume hydrogen peroxide.

7. As in 6, with a stream of carbonic acid gas in addition.

All the experiments, except 3, were continued during 90 hours. Loss of weight occurred in the following ratios:

	1.	2.	3.	4.	5.	6.	7.
Soft copper.....	37	5	18	1.5	55	8	37
Hard copper.....	48	3	37	5	56	14	57
Polished copper.....	73	15	49	1.5	44	15	47

It will be seen that the hard copper shows greater susceptibility to attack, although the experiments are not sufficiently conclusive. The increased action in the presence of carbonic acid gas is in all cases marked.

#### Hard and Soft Brass.

Two similar plates of hard brass were taken and one annealed before use. These were subjected to corrosion in a 1 per cent. solution of ferric chloride. The relative amounts of corrosion were: Soft, 51; hard, 49. The sample of hard brass became quite reddish on both sides, due to copper enrichment. The copper did not form a film, but when placed under water the color showed very distinctly.

The softened plate showed no trace of such an appearance and was uniformly acted on except where the edge of the sheet projected above the level of the corroding liquid and came into contact with the air. Just below this level the surface showed greater corrosion and some copper enrichment. Along two narrow lines, the continuations of which were visible owing to their somewhat greater brightness on the part not immersed, this deposit could be traced for about 1/2 in. below the line of liquid. These had the appearance of marks produced by rolling, the effects of which had not been quite obliterated by the annealing. Both plates were treated in the same jar, but were insulated from each other by glass rods.

The structure of the metal before and after annealing is shown in Figs. 1 to 4. The effect of the cold rolling on the crystalline structure will be noted.

Further experiments were made as follows: A strip of the same hard brass measuring 0.02 in. thick was softened over a portion of its length and bent in the form of an inverted U. The two limbs were placed in a corroding liquid containing approximately 10 per cent. hydrochloric acid and 5 per cent. copper chloride. They were left for 12 and 24 hours respectively. On removal from the liquid the difference in the rate of attack was very obvious. The hard limb had been seriously corroded, especially on the side facing the soft limb. The irregularity of the attack was very marked. It was most vigorous in lines running across the strip. These were parallel to each other and in the direction of rolling. It appears from these results that the hard material is electro-positive to the softer and solution therefore more readily takes place. Whether this is due to the fracture of the crystals during cold rolling, by which the texture is made more permeable to the corroding fluid, or whether the state of strain in which the metal exists in the hard material is the cause of the more rapid attack, does not appear.

Considered in the light of these results, the explanation of some of the phenomena occurring in some of the more rapid cases of corrosion may be facilitated, particularly the pitting and corrosion more or less in lines. The roughness caused by the corrosion thus set up may form the points from which the liberation of the gases contained in the condensing water takes

place. These vary in amount in sea water from 2.5 to 3.5 volumes of gas in 100 of water.\*

\* Hunter, *Journal of the Chemical Society*, 1870, p. 20.

	CO <sub>2</sub> .	O.	N.
	Per cent.	Per cent.	Per cent.
2.5 volumes contained.....	28.61	49.44	21.94
3.5 volumes contained.....	48.28	17.22	34.44

Dittman (Challenger Report, 1884) states that CO<sub>2</sub> in sea water is less than sufficient to produce bicarbonate with the carbonates present. Any tendency to concentrate the evolution of gas must also tend to localize the corrosion. A similar condition applies also to solid matter lodging in the condenser tubes. There is, however, this difference: The rough metal surface is part of the wall by which the heat is conducted from the steam to the water. The persistence with which bubbles of gas liberated from solution continue to rise from the same point, sometimes without any apparent cause, is well known, as also is the effect of introducing solid matter in some cases to prevent bumping.

In the discussion of the paper by J. T. Milton, already referred to, various points raised seemed to suggest that the causes of corrosion were not necessarily connected with the purity of the metal.

#### Troubles That Go Back to Rolling.

Figures given by Mr. Darley in connection with Muntz metal sheathing used in protecting harbor piles were very striking, materials in use for 25 and 26 years, respectively, showing little appreciation of the copper contents. He asserted that the trouble did not arise prior to 1899 and gave instances of very rapid deterioration subsequently. Without necessarily accepting the latter date, it may be that the increase in power of the rolling mills and other appliances used in the working of copper and brass during recent years, and other changes in the process of manufacture, may in some measure account for the changes in texture of the material, and it would appear that it should be the aim of the manufacturer to secure the greatest uniformity. The practice in tube making of giving the tube a final cold drawing in order to stiffen the tube, but not so as to render annealing necessary, may develop hardness sufficient to account for the initial roughening of the surface from which corrosion is subsequently continued in increasing amounts promoted by the liberation of gas. This renders irregular action possible without reference to slight changes in the composition of the metal.

#### Discussion.

In view of the statements in the paper concerning Muntz metal, Sir Gerard Muntz commented upon it at some length. He said that condenser tubes seldom pit on the steam side and when this occurs it is almost always due to the use of bad oil. Tubes pit mostly on the lower side, because it is the deposit that causes the trouble. Pitting in lines arises from several causes, the chief of which are continuous deposits lying along the bottom, and spills on the inside surface of the tubes, generally the result of the adherence of particles from the cores in casting these being elongated in the process of drawing. It was suggested by the author that plugs of copper are sometimes found in tubes, but these are really only points where the copper remains in situ, the zinc having been abstracted. In 99 cases out of 100 the deposits are brought in by the circulating water. The deleterious action comes from the setting up of galvanic couples between the zinc and the carbon of the iron. Another cause of corrosion is the decomposition of air and gases from too slow a flow of the circulating water, the latter becoming overheated. Misplacement or malformation of the water intake leads to the introduction of an excessive quantity of free air, and in that case where an alteration in the intake has been made the trouble has altogether ceased. His firm, he said, had had con-

denser tubes returned as defective, and investigation showed them to be wadded almost solid with shrimps and seaweed. Reference had been made to the corrosion of Muntz metal sheathing, bolts and the under-water fittings of ships. That trouble began with the employment of electrolytic copper in 1898, and save for the introduction of copper manufactured by the electrolytic process the practice of manufacture has remained unaltered for three-quarters of a century. When the trouble arose his firm made a most exhaustive inquiry. The results went to show that the corrosion was due first to the employment of electrolytic copper in the manufacture, and second, to the use of cheap black varnishes in the fastening of the sheathing in place of smelted copper and genuine Stockholm tar. The result was the formation of galvanic couples between the carbon in the varnish and the zinc in the metal sheathing.

Mr. Bengough explained the electrolytic theory and pointed out that worked material is usually electro-positive to soft material, hence the results obtained by Mr. Rhead in his ferric chloride tests, which showed the greatest total corrosion. This also accounts for the copper enrichment round the cut edges of plates. These are not deposits of copper, but areas from which the zinc has been dissolved, as pointed out by Sir Gerard Muntz. The practical consequence of the electrolytic theory is that anything which increases the number of ions in solution, which are less electro-positive than zinc, will increase corrosion.

#### The Westinghouse Electric & Mfg. Company's New Repair Department.

For some time a special department to handle repairs independent of all other work so that prompt attention and quick deliveries might be insured has been needed by the Westinghouse Electric & Mfg. Company, at East Pittsburgh, Pa. The crowded condition of the plant, however, rendered the construction of a new building imperative before a department such as the management had in mind could be established.

It was necessary since there was no large unoccupied space in the 47-acre plot of the company to depart from the established two-story type of structure and erect a higher building. The space available was 420 x 110 ft., and the new structure is 20 ft. shorter and 40 ft. narrower than this. The building is eight stories high, and the distance from the ground to the top of the cornice is 130 ft. The construction is skeleton self-contained steel and brick, and the structure is as nearly fireproof as it is possible to make it. The floor space is approximately 220,000 sq. ft., and in addition to the repair department houses the department manufacturing detail electrical apparatus.

Excellent facilities for receiving and dispatching goods are provided, although the new building is surrounded on all sides by other structures. Along the entire east side extends a covered shipping platform, paralleled by a railroad siding. A narrow gauge industrial railway and a number of covered bridges afford communication between the balance of the plant and the first and second floors respectively. One very large freight and five high speed combination elevators, all operated by electricity and controlled by automatic elevator controlling apparatus, are provided to transfer the material from floor to floor.

Working space for about 1500 people is furnished by the new building which enables the present output of detail apparatus to be doubled, and provides space for expeditiously handling a large volume of repair work. The desirability of having necessary repairs to electrical apparatus made by the manufacturer is apparent to every user, especially when the same standards of workmanship and material will be applied to the repair work as to the original piece of apparatus.

## Governing Rolling Mill Engines.\*

BY W. P. CAINE, ENSLEY, ALA.†

In considering the conservation of steam power equipment for driving rolling mills, we must take into account the two methods of rolling; the two-high mill driven by a reversing engine, and the three-high mill driven continuously in one direction; and the relative amount of power required for each. There is very little variation in the type used for each class of mill. Twin engines are used for two-high mills and single engines for three-high mills, usually tandem compounds. The reversing engine for the two-high mill must be powerful enough to take care of the engine and mill friction and the maximum torque produced by the piece in the rolls in any position. As these engines are usually twin engines with cranks at 90 degrees, each

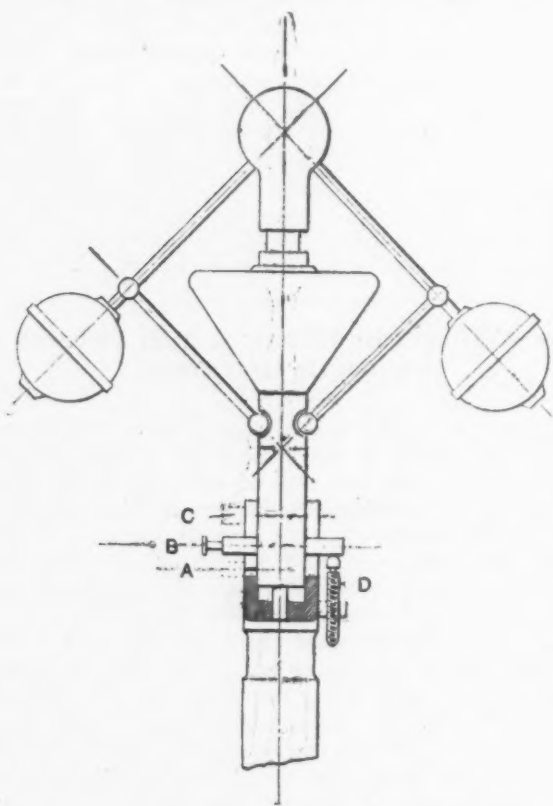


Fig. 1.—Diagram Showing the Location and Function of the Adjusting Screw (D) on the Governor.

side must be capable of doing the work alone when the other side is on the dead center.

In determining the size and distribution of the metal in engines of this type it is the custom to make the dimensions a little larger and the parts a little heavier than have been used before for the same work. Reciprocating parts are made heavier to stand the shocks, thereby increasing their inertia, and making necessary heavier frames, bed plates, bearings and pins, as well as more rigid adjustments, which in turn require more attention. As an example of the power sometimes used for an engine of this type, a certain engine may be cited which was fully capable of delivering 25,000 hp., while the actual average work on the steel passing through the mill could not have required more than 2000 hp. at the maximum capacity of the mill. The engine and mill friction, if the mill were driven continually in one direction, would not fall much short of 1000 hp. Assuming that each reversal would absorb 50 hp., and that there were 10 reversals per minute, 500 hp. would be consumed in this way. The total average work of the

engine was thus about 3500 hp., only 1-7 of its capacity.

As the three-high mill is driven continually in one direction, the energy stored in the flywheel makes it possible to do the same work with considerably less than one-half the maximum power required in the former case, the amount depending upon the size and weight of the flywheel. The greater the amount of energy the wheel can store up, the closer can the maximum power required approach the average work of the mill, resulting in the more economical use of steam and a lower cost of equipment. Mill designers do not always give sufficient consideration to this fact, and operators have to deal later with high steam cost and difficulty in keeping the proper steam pressure. Of course, there are other features to be considered, but economical use of power is a very important item.

For driving a three-high mill a twin engine of the cross compound type could be used with an intercepting valve such as is employed in locomotive practice by which the engine could be started from any position and handled by a quick acting throttle valve, so that it could be brought to a standstill as soon as a piece passed through the rolls, if another were not ready to enter the mill. Such an arrangement would go a long way toward answering one of the principal arguments in favor of the two-high mill; that its engine uses steam only when the piece is on the mill. If an engine of the type described be furnished with a very heavy flywheel located between the engine and the mill, the shocks due to the piece striking the rolls will be taken very largely by the flywheel. Furthermore, if the engine were so designed that it could not work through the wide range of steam admission, as is the current practice, the abnormal amount of compression now necessary would be cut down to a large extent, the parts would be strained less, and it would run with greater steam economy owing to the cutting out of the high release pressure during heavy work and the reduction of the number of strokes during the period of negative work.

Going into the details of operation of an engine driving a three-high mill, we find:

1. That the engine first develops just enough power to take care of the friction of engine and mill. If the engine were running at a constant speed during this period, just enough steam would be admitted to the cylinder at each revolution to do the work with the least possible variation of cut-off, resulting in the most economical use of the steam. The more the speed varies the greater the amount of steam required per horsepower developed. A constant speed is also desirable for another reason; the available energy stored in the flywheel is always normal under these conditions, whereas with a varying speed it would be below the normal about one-half the time. Should the piece strike the rolls when the steam pressure is low and the steel cold, the engine would be more likely to stall if the stored energy were below normal than if constant.

2. Next, the piece strikes the rolls. The initial force of this blow is absorbed by the flywheel and the speed of the engine is reduced in consequence. When this has dropped, say four or five revolutions, the governor has probably so adjusted the steam valves that the engine is developing its maximum power and the valves will remain in this adjustment until the engine is nearly up to speed again. During this time the release pressure will be high, making it necessary to carry a very high compression, conditions under which a noncondensing engine will make the most noise. Further, if the steam going to waste were utilized the engine would be capable of doing about one-third more work.

3. Next, the piece leaves the rolls. On many passes the engine is receiving the maximum amount of steam at this instant, and the flywheel absorbs energy through the increase of speed above normal. In the writer's opinion, this is the time when nearly all of the failures of flywheels on rolling mill engines occur, and

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† Tennessee Coal, Iron & Railroad Company.



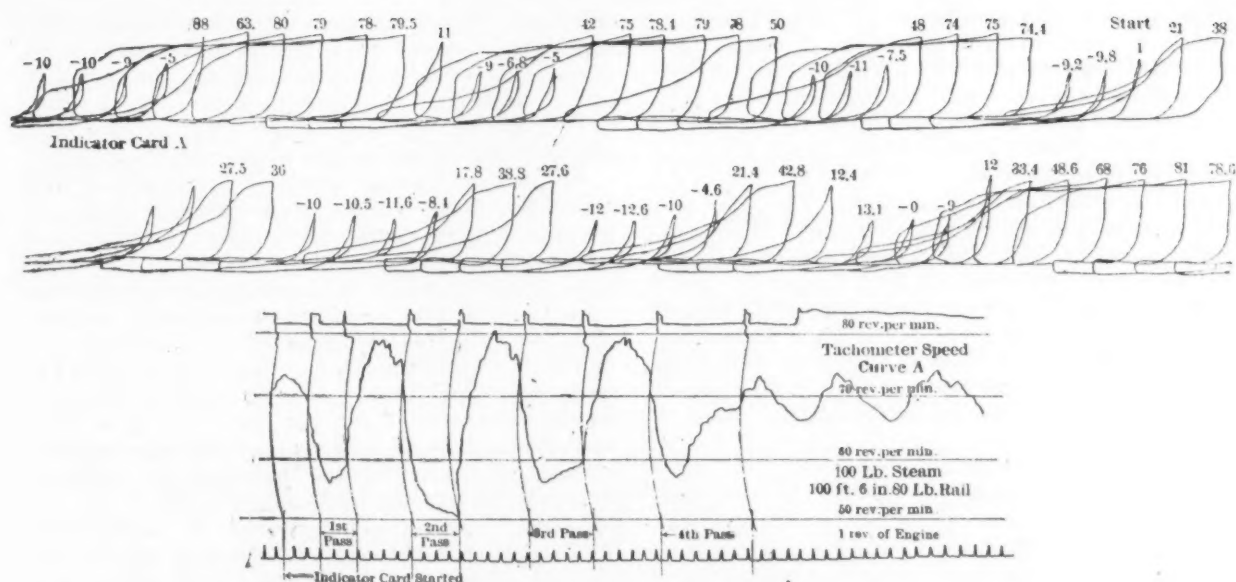


Fig. 2.—Continuous Indicator Card A and Tachometer Speed Curve A of No. 1 Rail Mill Engine, 52 x 72 In.—The card and curve were taken at the same time and show ordinary performance. The lower half of indicator card is a continuation of the upper half.

anything that can be done to cut down the amount of energy to be absorbed by the wheel at this time will increase the safety of the engine and decrease the repairs on the engine and mill. Having in most cases reached the highest point of speed, the governor will shut off steam entirely from the cylinder, the engine will slow down to several revolutions below normal speed before sufficient steam will be admitted to increase this speed again, and the result will be a wide range of the speed variation during the first period when the engine has simply to overcome its own friction and that of the mill.

The operations outlined in the foregoing are very complicated when two or more passes occur at once.

The results of a study of the above details of operation of the No. 1 rail mill engine driving the four-pass roughing rolls at the Ensley rail mill of the Tennessee Coal, Iron & Railroad Company, during a series of tests show how great a difference in the performance of the engine the writer was able to obtain with one adjusting screw added to the governor. The engine is a Reynolds Corliss, 52 x 72 in., noncondensing, equipped with a long range cut-off valve gear.

Fig. 1 shows the location of the adjusting screw D on the governor. Its purpose is to prevent the governor from dropping to position A which would allow

the maximum amount of steam to reach the cylinder, as determined by the valve gear. In this case the steam was admitted nearly three-quarters of the stroke with the governor in this position. When the pin is in position C the steam is entirely cut off. The screw D was adjusted very slowly while the engine was under load to determine the most advisable position B. This position must be at a point such that the engine will carry an average load and also will not stop under a heavy load. It can readily be seen that by reducing the range of adjustment of steam distribution the engine will operate with more economical steam consumption and the greatest strains on the engine and mill will be reduced.

The degree of success attained by this adjustment may be judged somewhat by the accompanying continuous indicator cards and tachometer speed curves. Card and curve marked A (Fig. 2) were taken together before the attachment was used. Card and curve B (Fig. 3) were taken when the attachment was in use.

The speed curves were made by a recording tachometer which the writer rigged up from a Schaeffer & Budenberg indicating tachometer. This indicating instrument was mounted on a plate, a bevel gear being fastened to the end of its driving shaft, which in turn

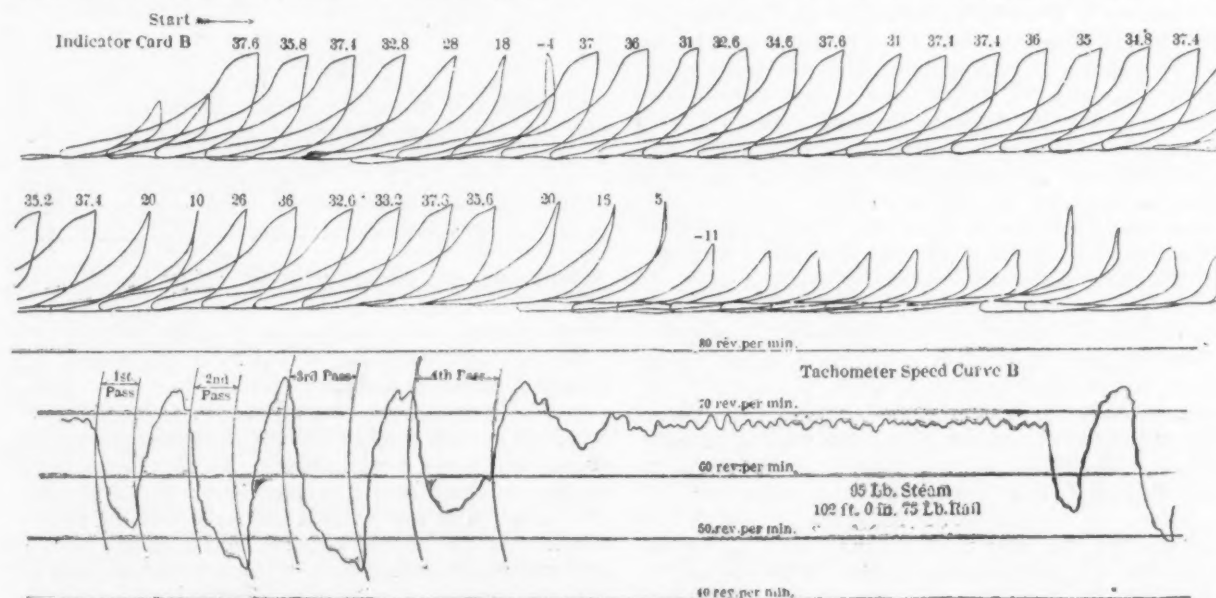


Fig. 3.—Continuous Indicator Card B and Tachometer Speed Curve B Taken When Running with the Caine Method of Engine Control.—The lower half of the indicator card is a continuation of the upper half.

drives a shaft with a worm at one end. The worm shaft is mounted on a bracket which will swing out of gear, thus disconnecting the indicating instrument if desirable. The worm wheel driven by the worm shaft runs loose on one of the paper-feed rolls, and when a record is to be taken a small clutch causes the worm wheel to drive the rolls. Two rolls are geared together and a third acts as a press roll. The paper rolls used were such as are furnished for the Uehling pneumatic pyrometer. The indicating needle on the original tachometer was replaced by a longer one which reached the paper. A pencil was attached to the end of the new needle, but there was so much friction that the records were of no value, so a small tin funnel was fastened to the needle and a linen thread passed through the hole in the bottom, protruding about 1/8 in. The ink in the funnel worked down the thread to the paper and made a satisfactory record.

Below the paper-supporting plate is a vertical plate to which are fastened two electric bells with the gongs removed and pencils substituted for the clappers. One of these bells was operated by a contact made once in a revolution of the engine, the record being shown at the bottom of the curve A (Fig. 2). As it was very evident that the paper would always feed the same amount at each revolution, it was not considered nec-

and boxes properly adjusted. The low terminal pressure is the cause of the engine's running much more quietly than when card A was taken. The indicated steam consumption of card A is about 43 lb. of steam per horsepower per hour, against 37 lb. in card B, a saving during rolling periods of over 20 per cent.

Of the speed curves, curve A shows that during the friction load the engine varies from 66 to 73 rev. per min., with an average of about 69 revolutions, and after the passes the speed becomes about 80 rev. per min., an increase of 11 revolutions above normal. Curve A shows that the second pass is the heaviest one of the four, the speed dropping to 51 rev. per min.

Curve B indicates that during friction load the speed varies only about 3 rev. per min., and that the highest velocity is 75 rev. per min., or 7 above normal. Some changes were made on the rolls between the two records, so that the third pass was as heavy as the second and the speed dropped to about 45 rev. per min. These curves indicate that the engine could be speeded up to about 75 rev. per min. and not exceed the speeds used before, that more energy was stored in the flywheel and that the engine would not drop below the speed shown on curve A.

Referring to the table, the constant used in items 7 and 8 is the foot-pounds of work for one stroke of

TABLE OF DATA FOR SUCCESSIVE PASSES

No. 1 RAIL MILL ENGINE, E. P. ALLIS, 52 IN. X 72 IN. 4 ROUGHING PASSES, ROLLS 27 1/2 IN. PITCH DIAMETER, PRODUCT 100 FT. 6 IN., 80-LB. RAIL, TOTAL WEIGHT, 2680 LB.

	FIRST PASS	INTERVALS	SECOND PASS	INTERVALS	THIRD PASS	INTERVALS	FOURTH PASS	INTERVALS	TOTAL
1 Area section after pass, sq. in.	54		33.5		22.9		19		
2 Length section after pass	15.95		25.7		37.6		45.2		
3 Revolutions	3.23	4.77	3.5	5.41	5.25	5.25	6.31	4.19	37
4 Speed at start	70.0	55	76	51	76.5	59	74	68	
5 Speed at finish	58.0	76	51	76.5	59.6	74	68	69	
6 Total m.e.p., pass and intervals	461.7		702.6		719.5		677.2		
7 Total energy pass and intervals, ft. lbs.*	5,755,000		8,758,000		8,968,000		8,440,000		
8 Total energy, ft. lbs.*	2,602,200	3,152,800	4,573,500	4,184,500	6,276,300	2,661,700	8,008,800	431,200	
9 Energy taken from flywheel, 1180 (n <sub>1</sub> <sup>2</sup> - n <sub>2</sub> <sup>2</sup> )	1,812,500		3,747,000		2,798,000		1,005,500		
10 Energy added to flywheel		2,846,000		3,836,500		2,254,000		161,700	
11 Energy, total	4,414,700		8,320,500		9,074,300		9,013,800		
12 Energy in friction, 64.320 ft. lb. per rev.	143,400	306,800	230,900	348,000	337,700	337,700	406,900	269,500	2,380,000
13 Energy, total, less friction in piece	4,271,300		8,089,600		8,736,600		8,607,800		29,705,300
14 Torque per foot length of piece	255,000		315,000		232,000		191,000		

\*From cylinders 12,464 X m.e.p.

essary to use this device each time. The other bell was operated on a circuit that had two gaps in series, one of which was closed when the indicator cards were started and the other kept closed except at the instant an observer at the rolls indicated the start and stop of the various passes, by momentarily breaking the circuit by means of a push button. This last feature also appears unnecessary, as the speed curves have a pronounced change of direction at these instants.

From card A it will be noted that during the four passes there are 37 records showing that the engine is taking steam, and 22 records showing that it is not. These would lead one to think that if every card were a positive one, and the work were distributed throughout the entire period between pieces, and the mean effective pressure averaged, there would be a more economical use of steam, and possibly with a heavy flywheel the size of cylinder could be reduced. That would be the ideal condition, which cannot be realized, however, because of three changing functions: The varying time between pieces, the varying temperature of the steel, and the varying steam pressure. Card B, Fig. 3, shows the engine doing the same work as before, on a piece of the same length, and it can be seen that the work is distributed over 34 revolutions and only two negative cards. With the engine running as this card shows, it is a comparatively easy proposition to set the valves for economical steam distribution and it is also much easier to keep the rods

the engine at 1 lb. mean effective pressure. In the original calculation for item 9, only the flywheel was considered. This is 22 ft. in diameter, weighs about 130,000 lb., and has a radius of gyration of about 7.4 ft. Taking the formula

$$\text{energy} = \frac{Wv^2}{2g}$$

and altering it to get the energy stored up or given out at a change in velocity of 1 rev. per min. it becomes

$$E \text{ for 1 r. p. m.} = \frac{\text{wt. wheel} \left( \frac{\text{radius gyration} \times 2\pi}{60 \text{ seconds}} \right)^2}{64.32}$$

Substituting and solving with the values given above  
E for 1 r. p. m. = 1220 ft.-lb.

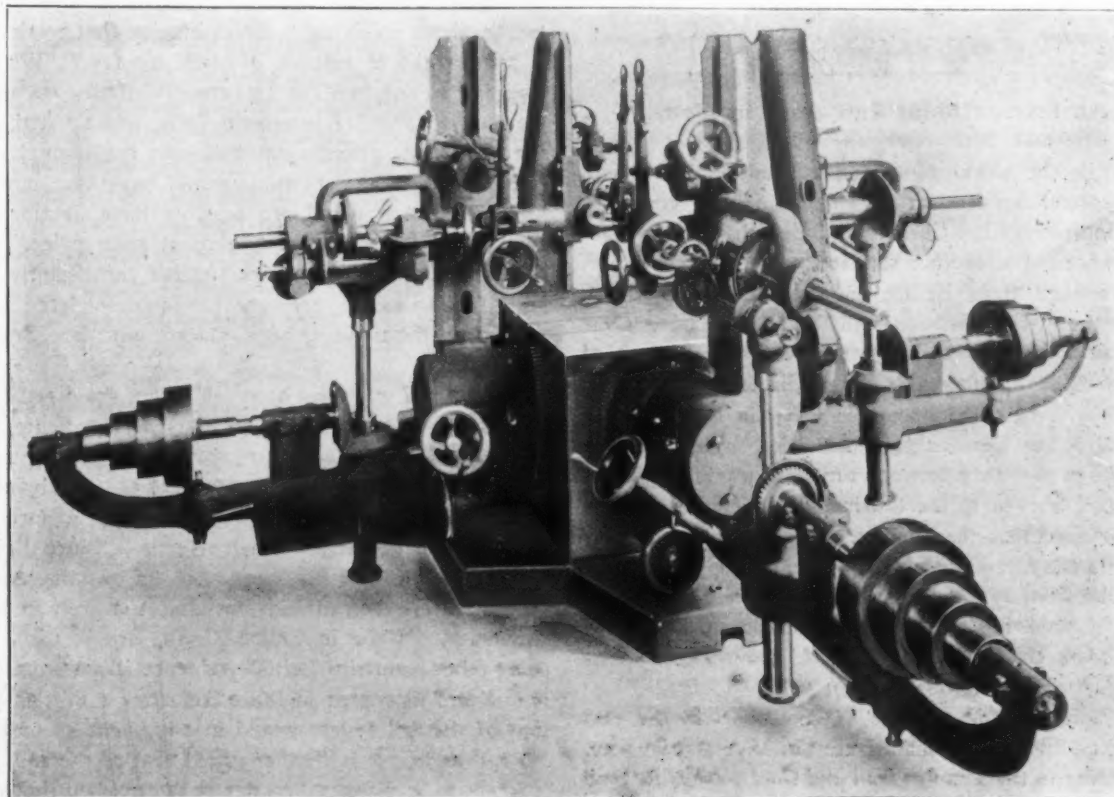
As the energy varies as the square of the velocity, we would use the following to represent the amount of energy involved in a change of velocity.

$$E = 1220 n_1^2 - n_2^2$$

in which n<sub>1</sub> is the higher number of revolutions of the engine and n<sub>2</sub> the lower number. In checking this up against indicator card and speed curve results on friction alone, it became evident that 1180 was the proper constant to use to include the inertia effects of the mill and reciprocating parts. The constant in item 12 was the average foot-pounds of work per revolution during the friction period as calculated from the indicator cards.

**A Special Barnes Horizontal Radial Drill.**

A special type of four-head No. 3 horizontal radial drill was recently built by the W. F. & John Barnes Company, Rockford, Ill., the novelty of which is in the table itself. This machine has a table 30 in. square, made to receive four of the radial heads used on the regular type of drill. The heads are opposite each other in their normal position, but are capable of adjustment both vertically and radially. This machine was made up for a customer who had boring, tapping and other operations to do on a casting which contained two holes of different diameters on each of the four sides. By arranging the heads so that all could work at once, the machining is completed with one setting of the casting, as the spindles can be set in the proper position to perform the operations required.



A Special No 3 Four-Head Horizontal Radial Drill Built by the W. F. & John Barnes Company, Rockford, Ill.

This new machine is practically the same as the regular No. 3 drill made by this firm, with the exception previously mentioned of the special type of table. The spindles of this machine are 1 5-16 in. in diameter and are fitted with No. 5 taper holes. Three means of feeding the spindle to the work are provided: a lever feed, the hand wheel and the power feed.

The principal dimensions of this machine and its capacities are given in the following table:

Distance from top of table to center of bearing, inches....	8 3/4
Center of bearing to maximum height of spindle, inches....	38 1/4
Size of bearing, inches.....	9 x 12
Movement of spindle arm, degrees.....	180
Maximum distance from table to center of spindle, inches..	20 1/4
Minimum distance from table to center of spindle, inches..	2 1/2
Size of table, inches.....	30 x 30
Horizontal travel of spindle, inches.....	18
Face of arm, inches.....	8 x 9
Drilling capacity in solid cast iron, inches.....	3
Drilling capacity in steel, inches.....	2
Tapping capacity in cast iron, inches.....	3
Capacity of pipe tap, inches.....	2 1/2
Weight, pounds.....	9,000

The machine is well built, is provided with back gears and all parts are within easy reach of the operator. The table is slotted for holding the work, the arm is of the heavy box pattern and the sliding head is gibbed securely on the square ways of the arm.

**Roe & Conover's New Warehouse in Newark, N. J.**

Roe & Conover, who conduct in Newark what is said to be the largest machinery, hardware, tool and general supply jobbing establishment in New Jersey, have made an important change in their business by removing from the center of the city, where the general machinery and supply trade has been concentrated, to the outskirts, a distance of about 1 1/2 miles from its former location. This change is considered a rather courageous one, as it takes the business away from the recognized center of the machinery and supply trade in Newark to a section that is not congested. The firm has been located, from the time of its organization, in the business center of the city, but its business has of late grown so rapidly that great difficulty has been

experienced in handling its shipping because of the limited amount of space offered for wagon traffic at its old location, 21 to 23 Mechanic street.

The new warehouse, which has just been completed, occupies about two city blocks, with a frontage extending from 206 to 210 Frelinghuysen avenue. The main building is 86 x 220 ft.; it is 30 ft. high in the center with side walls 20 ft. in height. The building is of brick and mill construction. The structure is used for general storage purposes, with bins and shelves arranged in departments to handle different kinds of supplies. The offices are in the front of the building and on the south side are large sliding doors which allow for the unloading of six freight cars at one time. A siding extends from the warehouse to the tracks of the Pennsylvania Railroad. In the rear of the main building is a pipe shed, 22 x 106 ft.; a storage house, 35 x 91 ft., and a machine shop, 41 ft. square. The shop is equipped with facilities for cutting pipe and other material to size. Another building, 25 x 25 ft., is utilized for the storage of oakum, roofing paper and other inflammable material.

The West Penn Steel Company requests that hereafter all letters for its sales and order departments should be sent to Brackenridge, Pa.



# THE IRON AGE

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MECHANICAL EDITOR

## An International Rail Pool Incident.

While the workings of the international rail pool are not well known, an occasional incident comes to light indicating that German and British rail manufacturers are not altogether satisfied. Last year the complaints were from British sources, and were to the effect that while German mills were increasing their exports over those of 1907, the reverse was true of British mills. This year signs of discontent appear in Germany. As noted in a recent Berlin letter to *The Iron Age*, the German press has been saying that the division of territory between the chief producing countries has worked to the detriment of German makers. It was cited that the exports of steel rails from Germany in the first eight months of 1909 dropped to 229,700 tons from 271,400 tons in the first eight months of 1908. Comparing the same two periods, the rail exports from Great Britain increased from 284,000 tons last year to 406,000 tons in 1909.

In spite of this reversal of conditions in the two countries, British rail manufacturers have a grievance. According to the *London Iron and Coal Trades Review* they are disturbed because the Transvaal Government some time ago placed a 36,000-ton rail order with a Russian works. As stated by Lord Crewe in a letter to the *London Times*, the conditions surrounding this transaction were these:

All manufacturers of steel rails in the United Kingdom were members of the rail pool, and their prices were from £5 5s. to £5 7s. 6d. per ton, f.o.b., which meant £6 2s. 6d. to £6 5s. per ton to Delagoa Bay, as against £5 13s. and £5 14s. quoted by the Russian manufacturers. Representations to the British manufacturers, with whom the administration were naturally most desirous of placing the contract, failed to give any promise of a reduced quotation, and, as time was of moment, the Russian firm being about to join the "ring," when the contract was under negotiation, there was no alternative but to close the transaction with that firm. . . . To a certain extent the difference in price between the British and Russian manufacturers is accounted for by the fact that the sea freight charged by the conference lines on shipment of rails from United Kingdom ports is 17s. 6d. per ton, whereas it is understood that the successful contractors are paying about 12s. per ton.

That the Russian works in question has been a disturbing factor in the international rail trade has been known for a good while. The Cape Colony Government, it is stated, placed an order a few months ago in Russia for several thousand tons of rails, after having received quotations from British members of the rail syndicate. Later when the Transvaal Government came into the market, it is understood that acting on the

suggestion of the Cape Government it sent its inquiry to Russia without giving British rail mills a chance to bid. The explanation given is that the Transvaal Government was informed that no British maker could quote below the pool price.

Prominence is given by the *Iron and Coal Trades Review* to a peculiar feature of this transaction, and the statement of it conflicts somewhat with Lord Crewe's version. After the Cape government had secured its rails and before the Transvaal inquiry was sent out, the Russian mill was taken into the pool. It would have been unable to quote below the pool price on the 36,000-ton order but for one fact; that is, that the Transvaal government asked for quotations from no other mill. We are told in this connection that the syndicate agreement "provides that in the case of one works alone receiving a direct inquiry that works has a prior right in respect of such inquiry." Without stopping to question the authenticity of this statement we pass to another interesting one, namely, "that if the Transvaal government had sent the inquiry to a British works the conditions would have been entirely different and it could not possibly have obtained its rails from Russia under the association price." Be this as it may, it is mentioned rather significantly that "the Transvaal government has since ordered more rails and these have been placed with an English maker."

In spite of what has been said about the dissatisfaction of German members of the rail syndicate, our London contemporary insists that at present the working of the syndicate is very much to the disadvantage of British makers. It believes that the export rail trade should go largely to British mills, since British colonies are among the largest buyers of rails, and in the Argentine the railroads are almost entirely in British hands. While in China, Japan, Brazil, Chili and some other countries British influence is not so strong, it is urged that even in those countries a fair proportion of the rail orders would in any event go to British rail mills. It is further urged that as the rail pool is likely to be dissolved sooner or later, when that time comes British makers will find it hard to recover lost ground. On the other hand, the stake of German makers in the maintenance of the pool is great, since the price on the large business placed by the Prussian State Railways is based in part on that realized by German makers in their export trade.

There will be blunt dissent by rail manufacturers in other countries from the above statement of British claims. It will be based not only on the known ability of mills in Germany, for example, to manufacture rails at considerably less than British mill costs, but on the ability of mills in other countries to take business in competition with Great Britain in the years preceding the formation of the syndicate in 1905. Exception will be taken also to the implicit confidence shown in the preponderance of British influence, financially and otherwise, in certain foreign markets. From a standpoint neither British nor German, it may be suggested that no rail mills in the leading rail producing countries have more to gain from an international rail agreement, looking forward to a not very distant day, when German and American rail makers will be even more alert for foreign business than these same mills in the United Kingdom. That they are not faring ill, even now, appears from the latest statement of British

iron and steel exports, showing rail shipments to other countries of 524,745 tons in the 11 months ending November 30, 1909, as against but 394,387 tons in the corresponding period of 1908.

### The Mesaba Range the Key to the Lake Ore Situation.

The Mesaba range has again demonstrated that it must be depended upon to furnish any material increase in any year upon the average output of Lake Superior iron ore in the early years of the present decade. While the all-rail shipments of lake ores in 1909 will not be known until the statistics for the calendar year are made up, the figures for water shipments show that the Mesaba range more than supplied the increase made this year over the record shipments of 1907. Estimating all-rail shipments from the Mesaba range at 100,000 tons and from the old ranges at 700,000 tons for 1909, it appears that the Mesaba range furnished about 66 per cent. of the ore shipped in 1909, and that its total this year was about 700,000 tons more than its previous record, made in 1907. On the other hand, the old ranges this year have fallen nearly 500,000 tons short of their greatest production, which was in 1907.

For the purpose of comparison we have set down in the table below the shipments from old ranges and from the Mesaba range in 1900 and subsequent years and have also shown the increase in total lake ore shipments in each year over the previous year, together with the increase in Mesaba shipments year by year. In each of three years—namely, 1903, 1904 and 1908—there was a falling off both in total shipments and Mesaba shipments from those of the preceding year:

Comparison of Mesaba Range Shipments with Old Range Shipments of Lake Superior Ores.—Gross Tons.

	Old range total.	Mesaba total.	Total increase over previous year.	Mesaba increase.
1900.....	11,270,844	7,809,535	808,844	1,183,751
1901.....	11,611,017	9,004,890	1,535,528	1,195,355
1902.....	14,243,064	13,342,840	6,969,997	4,337,950
1903.....	11,415,968	12,892,542	*8,277,394	*450,298
1904.....	9,693,393	12,156,008	*2,459,109	*736,534
1905.....	14,225,417	20,158,699	12,534,715	8,002,691
1906.....	14,446,733	23,819,029	4,181,646	3,660,330
1907.....	14,770,960	27,495,708	3,700,906	3,676,679
1908.....	8,757,637	17,257,350	*16,251,681	*10,238,358
1909.....	†14,283,873	†28,200,000	16,468,886	10,942,650

\* Decrease. † All-rail shipments estimated.

The significant fact brought out by the figures in the first column above is that the old ranges are limited in their ability to respond to the rapidly increasing demand of the iron and steel works of the country. It will be seen that in no year did the old ranges reach an output of 15,000,000 tons. In 1906, when the iron industry was straining to increase its production, the old ranges did only about 500,000 tons better than in 1905, while the Mesaba range increased seven times 500,000 tons. The next year the Mesaba range increased a little more than in 1906, or by 3,676,000 tons, while the four old ranges in a supreme effort to respond to the enormous requirements of blast furnace and steel companies added but 25,000 tons to their record of the previous year. In the five-year period between 1902 and 1907 the table shows that while the old ranges added only a little more than 500,000 tons, the Mesaba range more than doubled its output, showing an increase of 14,150,000 tons.

The record of 1909 is not conclusive as to the abil-

ity of the old ranges to exceed the high figure of 1907. Early in the season the demand for ore was very much less than in the fall months and mining operations could not be adjusted in a week or a month to the new pace. New properties are being developed on the old ranges, but they are few and their ability to make up for the declining output of famous mines of other years may be questioned. On the other hand, the Mesaba range has made a new record in 1909, even though up to this time very little ore has been shipped from the Hill properties acquired by the United States Steel Corporation. In view of the development work put upon these and other Mesaba mines it will be easily possible for that range to add a good many millions of tons within another year or two to the unprecedented shipments of 1909. From this time on the ratio of 2 to 1 between Mesaba and old range shipments may be expected to show a steady increase.

### The Combustion Engine and the Machinery Trade.

Opinions in the machine tool trade vary considerably as to the future buying power of the automobile industry. It all depends upon the manufacturer's or dealer's field of vision. If he considers only the builders of pleasure vehicles he expects a greatly decreased market. If he takes into account the motor vehicle for business purposes he sees a growing demand from this source to counteract some of the loss in pleasure cars. If he goes still farther and reckons in the combustion engine for all other purposes, he believes that a source of absorption of machinery, already important, is to increase to such an extent, gradually and healthily, that a normal market of great volume will be established, more than making up for the wonderful wholesale buying for pleasure vehicle building of the present time. The various elements mentioned are not at all new; they have been discussed in great detail. But in combination, in their effect upon the machinery business, looking ahead over a decade, there may be a good purpose in taking up the question from this general aspect.

It may prove true that the limit of production of pleasure cars has been approached. The engine propelled vehicle for industrial and commercial uses, however, has hardly passed the infancy of its buying. The truck, the traction engine, fire apparatus and light wagons are constantly growing in popularity, as they have been developed to the point of efficiency and reliability. A still greater promise of usefulness exists for the combustion motor in industry in general, apart from propelling vehicles and boats. In combination with all sorts of mechanisms for every possible purpose they are selling with increasing ease. Farmers alone are using thousands of them. Much has been accomplished with gasoline. The kerosene engine has taken an important place, largely because of its cheaper fuel. The alcohol engine undoubtedly will increase in popularity. The crude oil engine of simple mechanism will soon be in the field in a big way, bringing the cost of operation to a very low figure. All this means great machinery requirements, absorbing the products of the shops, with less feverish haste than the automobile industry of to-day, but affording a more enduring customer. The automobile business will become more steady. Its history is likely to be similar to that of the electrical industry. The promoter element which

is figuring in the present machinery market will disappear. Some good concerns may go out of existence. The business will get down to a solid basis, probably in large units of capital. It will always be a strong buyer; at least until something comes forward to take its place in popular favor. But it will not occupy such a preponderating position in the market. The commercial vehicle and the combustion engine of the broader field will share in it in a very different ratio.

### British Rules Governing Wet Grinding.

American experts have always made sharp distinction between wet and dry grinding in the effect upon the health of employees. No one disputes that dry grinding is a dangerous occupation. Legislation has compelled the employment of exhaust systems, to remove the dangerous particles of dust from the workroom. In fact, many employers made the necessary installations before the statutes required it. But wet grinding has not been regarded as a serious menace to health, because the copious flow of water or other fluid is believed to carry away the chips and dust and atoms of abrasive, so that little or none of the residue gets into the atmosphere. Few who have had experience with the modern grinding machine would doubt that this opinion is founded upon sound observations.

The British authorities have decided otherwise and have promulgated new rules to govern the practice in manufacturing plants when grinding is an element in manufacturing beyond the occasional use of a wheel for sharpening tools in machine shops. A recent investigation brought out medical evidence which, according to *Engineering*, established that both wet and dry grinders are affected by disease of the respiratory organs, more especially by fibrosis of the lungs and by phthisis. The mortality caused by the latter disease is said to be six times greater than among the average of occupied males, though the men entering these trades are generally about the ordinary standard of physique and vigor, the work being unsuitable for weakly men. As a result of these opinions rules have been sent out which require the usual installation of exhaust systems for the removal of the dust in dry grinding and make the following provision applying to wet grinding: "In any room in which wet grinding, dry grinding or the racing of grindstones is carried on, the floors and belt races shall be firm and capable of being cleaned, and in the case of new buildings shall be water tight. Once a week, on a fixed day, the floor, belt races and uncovered parts of machinery shall be thoroughly cleaned from dust, during which process the floor and belt races shall be damped to prevent dust rising. The walls and ceilings, if not painted with oil or varnish at least once in seven years, shall be lime-washed at least every 14 months, to date from the time when they were last lime-washed. If they have been painted or varnished they shall be washed at least every 14 months. All windows must also be kept clean."

It would be well if these cleansing methods were followed by those who do wet grinding in this country. The welfare of workmen is a most important matter and such a simple precaution as this should be put in practice. It means trifling expense as compared with the evident benefit.

### Details of Limits in Shop Drawings.

Many drawings submitted with specifications for estimates on work are lacking in details as to limits. This complaint is frequently heard. Under the system of the modern drafting room there would seem to be small reason for such a condition. Precision methods of metal manufacturing, particularly in the building of machinery, usually carry with them very narrow limits. When the work is to be done in the home plant it is essential that the working drawings convey the most exact information to the shop. If a sliding fit is to be made the workman should know it instantly from the drawing furnished him. He may be told by his foreman or by a draftsman, but this does not insure that he will be at his machine the next day, and that some one else will not have to carry on the job. He may trust to his own judgment, perhaps, and make a wringing fit instead. If the necessity for such care in preparing detailed drawings exists in manufacturing routine at home, it is still more important when blue prints are to be sent away, with the purpose of having the work done in another shop. Delays occur because correspondence is required to elucidate essential details. Even errors in estimates have arisen through misunderstandings, which would have been impossible had the drafting room done its work thoroughly. It is a weakness of system easy to correct.

During recent years a great many improvements have been made in zinc plating, until at present it is possible to produce much more durable work by this process. While steel or iron coated with zinc is chemically protected against rust, the zinc itself needs protection, if the article so coated is to be exposed in places where the air contains gases which readily attack zinc; for instance, where manufacturing to a large extent is carried on, or the article is required to last a great number of years. To protect zinc, it must be plated with nickel or tin or some other metal of enduring qualities. The Stearns & White Company, North Franklin and Chestnut streets, Chicago, realizing the need for such plating, are now furnishing the chemicals and the necessary instructions how to use them to secure the best results.

The Department of Mining Engineering of the University of Illinois has recently issued a circular descriptive of the course in mining engineering lately established at the university. This circular can be obtained by applying to the registrar of the university, Urbana, Ill. The bill establishing the Department of Mining Engineering in the State university was passed by the last Legislature of Illinois, and was cordially supported by the United Mine Workers of America and the Illinois Coal Operators' Association, so that the department can truly be said to have been established in response to a demand coming from all branches of the mining industry. The general public is so accustomed to consider Illinois as an agricultural State that it does not realize that she ranks third among the States in the amount of her mineral and metallurgical output, being surpassed in this respect only by Pennsylvania and Ohio.

The Q M S Company (Quincy, Manchester, Sargent), Plainfield, N. J., announces that on January 1 it will move its Western office from 1775 Old Colony Building to 738 First National Bank Building, Chicago. Its interests in the West will hereafter be taken care of by John C. Hoof.



## Customs Decisions.

### The Scrap Iron and Steel Duty.

Indications are multiplying that the scrap iron and scrap steel provision of the Payne tariff will prove a frequent bone of contention between the Government and importers of these materials. While the new tariff reduces the rate of duty on scrap from \$4 to \$1 per ton, the paragraph on this subject is more restrictive than in the act of 1897, usually referred to as the Dingley tariff. Recently, the Treasury Department issued an order to customs officials outlining the manner to be followed in returning scrap iron and steel under the act of 1909. It appears, however, that the regulations thus established are unsatisfactory to the handlers of the scrap. It developed last week that after the submission of a test case to interpret paragraph 118 of the Payne law, the importers have asked that the entire proceedings before the Board of United States General Appraisers be reopened.

The act of 1909 carries a limitation to the classification of metal materials as "scrap," by the use of the term "nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel fit only to be remanufactured by melting, and excluding pig iron in all forms." The word "melting," appearing in a tariff law for the first time, seems to be responsible for the friction now developing. That the new limitation would prove a disturbing factor was early made apparent to the Treasury Department in the form of letters from all parts of the United States protesting against the curtailment of scrap importations by limiting such entries to those "fit only to be remanufactured by melting." It is understood that the importers in the test case have reached the conclusion that testimony placed before the Board subsequent to the promulgation of the Treasury's recent order regarding the melting interpretation is not adequate, and for this reason the application has been made for a rehearing.

The Treasury Department's reply to inquiries reads in part as follows: "In this regard, I have to advise you that scrap iron and scrap steel which may be remanufactured by being subjected to intense heat and then rolled or hammered to the size or shape desired is not scrap iron or scrap steel within the meaning of paragraph 118 (act of 1909), for the reason that in the opinion of the Department the term 'melting' in this paragraph is used in its ordinary adaptation, that is, to become liquid through heat, and therefore no scrap iron or scrap steel is entitled to classification under paragraph 118 unless in its condition as imported it is unfit for use until it has been reduced from a solid to a fluid state by means of heat."

The understanding at the offices of the Board of General Appraisers is that the protestant in the contemplated test case is prepared to submit new testimony showing that scrap may be utilized without the melting process contemplated by the new tariff.

### The Government Defeated in the Ferroalloy Test Case.

The Treasury Department is about to promulgate a decision by the United States Circuit Court of Appeals, adverse to the Government, in the recently instituted test case to determine the dutiable classification of the so-called ferroalloys, including ferrochrome, ferrovandium and ferrotungsten. This case was brought in the United States Circuit Court for the Eastern District of Pennsylvania by agreement with certain importers for the purpose of testing the question as to whether the contention of the Government that these ferroalloys were dutiable under the Dingley act at 20 per cent. ad valorem as unwrought metals, or at the same rate of duty as unenumerated manufactured articles, could be sustained by the presentation to the court of the latest information obtainable respecting the advance said to have been made in the manufacture of certain of these alloys into different forms and shapes as distinct from their use for the purpose of importing certain qualities to steel.

In ruling upon the importations in question the Board of General Appraisers held them to be dutiable as "metals unwrought," but this decision was reversed by

the United States Circuit Court on the authority of the United States *vs.* the Roessler & Hasslacher Chemical Company. When the case reached the Court of Appeals the Department of Justice employed James L. Gerry, late chief of the Customs Division of the Treasury Department, and Charles Fuller as special assistants to Deputy Assistant Attorney-General D. Frank Lloyd. The Court of Appeals, however, has affirmed the court below, Judge Lanning handing down the opinion, as follows:

There is some evidence before us that these ferroalloys can be wrought into different forms and shapes by forging and hammering, but it is not shown that these changes are commercially profitable or that the alloys are to any extent imported to be themselves wrought into useful articles. Their well-known general use is for imparting certain qualities to steel in the process of its manufacture. Uniformity of decisions, especially in administering the tariff act, is most desirable. This is shown in the opinion of the circuit court rendered in this case and reported in 171 Fed. Rep. 245 (T. D. 2-764). We agree with that court that the facts in the case at bar do not warrant a departure from the classification made in the Roessler & Hasslacher case.

### Ferrosilicon.

A controversy between the Stauffer Chemical Company and the Government regarding the classification of ferrosilicon has been decided by the Board of United States General Appraisers adversely to claims of the importing company. Duty was exacted at the rate of 45 per cent. under the metal schedule. The importers filed a claim for duty at 8-10 of 1 per cent. per pound, alleging that the articles fall within the provision for castings of iron. General Appraiser Fischer, who writes the decision for the Board, is of the opinion that the silicon in the articles is of chief value, rather than the iron. On this account, the general appraiser holds that the merchandise is more specifically provided for at 45 per cent. than as "castings of iron." It appears that the Government chemist made an analysis of the castings from which he ascertained that the articles are made from ferrosilicon containing 14.48 per cent. of silicon. The decision says that a silicon of this kind is probably made by the blast-furnace process, though alloys with higher percentages of silicon are now being made in electric furnaces. It continues:

The presence of some silicon would not necessarily cause the iron to be anything other than iron, and a casting of the material to be other than casting of iron. There are, however, ferros, such as iron in combination with silicon, where the alloy is made for the purpose of obtaining a combination of iron with a large percentage of silicon. That a distinction is made between ordinary iron and such alloys is evident, and the intent to distinguish is shown by the use of the terms "iron in pigs," "ferromanganese," "ferrosilicon," &c., in paragraph 122 of the tariff act of 1897. On the record we would not be warranted in holding these castings of ferrosilicon to be within the provision for castings of iron.

### Old Iron Plates from an American Vessel.

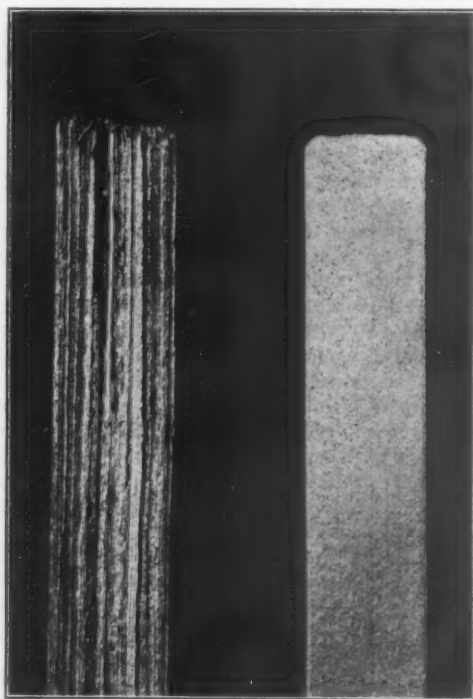
Old iron plates taken from the sides of an American vessel drydocked in a Canadian port for repairs cannot be entered free of duty when brought back to this country, according to a decision made by the Board of United States General Appraisers in a protest case filed by George S. Bush & Co. It appears that the steamship Northwestern, said to be an American vessel, formerly known as the Orizaba, was wrecked on the coast of Alaska in 1907. After having undergone temporary repairs it was taken to the drydock in British Columbia, where the vessel was permanently put in order. The plates, the subject of controversy, were the damaged plates stripped from the vessel in making the permanent repairs. The importers objected to the action of the United States authorities in exacting a duty of \$4 per ton on the plates as "scrap iron." Instead, the importers alleged that the plates should have been admitted free of duty as American goods returned without having been improved in value or condition. In overruling the contention, General Appraiser Fischer says in part:

There is no proof before us tending to show where the vessel was built, or that the material used in building it was of American origin, or that even if of American origin such material was not improved in value or condition after leaving the United States. The fact that the vessel's name had been changed from the Orizaba to the Northwestern might indicate that the vessel was of foreign construction and that it had been given American registry.

### Distinguishing Wrought Iron from Steel.

The ability to distinguish between wrought iron and steel is a valuable acquisition. Nevertheless there are many who do not know of any test which can be applied to material to determine whether it is wrought iron or steel and are compelled to rely upon the word of the supply man. It is, therefore, desirable that the plumber and the steam fitter should possess some knowledge along these lines, and to this end the following is taken from the *Brass World*:

For many purposes wrought iron is superior to steel, although large quantities of soft steel are now used where wrought iron was previously employed. For



Iron.

Steel.

Appearance of Iron and Steel After Etching.

skimmers and stirrers used in brass melting, wrought iron lasts much longer than steel and should be used for this purpose.

As it is frequently desired to ascertain whether a specimen is wrought iron or steel, a simple test will serve to indicate it. The sample to be tested is cleaned from grease and scale by scouring and then immersed in a solution composed of the following:

Water .....	9 parts.
Sulphuric acid.....	3 parts.
Muriatic acid.....	1 part.

The acids are poured into the water and allowed to cool. A glass or porcelain vessel is used. The specimen is allowed to remain in the solution for 15 to 20 minutes, when it is removed, rinsed in water and dried with a cloth. The fibers will now show plainly, but if not it is returned and allowed to remain longer. As iron is made up of a series of fibers, interspersed between which is the slag, it is a simple matter to distinguish it. Soft steel dissolves uniformly and without fibrous structure found in wrought iron.

The American Railway Association's statistics show that on December 10 the total of car surpluses on lines in the United States in Canada was 57,470 and the total of shortages 18,593, making the net surplus 38,877 cars, against 12,032 November 24, and comparing with net shortages of 3286 and 5467 cars on November 10 and October 27 respectively.

### The Firebrick Freight Rate Ordered Reduced.

Through the efforts of the Stowe-Fuller Company, Cleveland, Ohio, a reduction has been ordered in the freight rate on firebrick on shipments eastbound from Central Freight Association territory to Trunk Line territory. For years the iron and steel interests have paid a higher freight rate on firebrick for their work than either on building or paving brick. The company above named has been fighting this case before the Traffic Association for the last six years and finally had to bring it to the attention of the Interstate Commerce Commission, who decided in 1907 that "a brick should be a brick." This matter was taken into the courts and a rehearing was obtained and finally decided the past week.

It was proved in the testimony taken that firebrick could be hauled, if anything, cheaper than other grades of brick and put at the same relative value per ton. The company says in regard to this matter: "For years railroads have hauled breakfast foods in packages on a basis of 17½ cents per 100 lb., New York and Chicago, whereas they demanded 25 cents for firebrick. For instance, the Indiana Steel Company at Gary probably used 50,000 pressed brick in its office building, which it obtained from Ohio at a rate of \$1.50 per ton, but on the 100,000,000 brick which it put in its works it was obliged to pay \$2 per ton. This same case applies to all manufacturers, only in a smaller way, and the principle that rates must be made on the basis of cost of transportation establishes a new principle which is right and just. If the railroads lose money at hauling breakfast foods at 17½ cents per 100 lb. there is no reason why the firebrick men should pay an over-rate to make up the loss.

As this decision puts all brick on the same rate, iron and steel manufacturers will now pay no higher rate on firebrick than on brick for other purposes. The decision is as follows:

It is ordered that said defendants be, and they are hereby, notified and required to cease and desist, on or before the 1st day of February, 1910, and for a period of not less than two years thereafter abstain, from charging, demanding, collecting, or receiving for the transportation of firebrick, building brick, and paving brick, in carloads, on shipments eastbound from Central Freight Association territory to Trunk Line territory the rates based upon the present Chicago-New York base rate, which rates have been found by this commission to have been unreasonable.

It is further ordered that said defendants be, and they are hereby, notified and required to establish and put in force, on or before the 1st day of February, 1910, and maintain in force thereafter during a period of not less than two years, and apply to the transportation of firebrick, building brick, and paving brick, in carloads, on shipments eastbound from Central Freight Association territory to Trunk Line territory rates based upon a Chicago-New York base rate not exceeding 21 cents per 100 lb., which rates have been found by the commission to be reasonable maximum rates to be applied.

And it is further ordered that said defendants be, and they are hereby, authorized to make effective upon three days' notice to the public and to the Interstate Commerce Commission, given in the manner required by law, the rates which said defendants are by this order required to establish and put in force on or before the 1st day of February, 1910, in which event the tariffs in which such rates are given must contain the notation that they are issued under the authority hereby granted, and must refer to the number of these cases.

According to a deed filed at Lebanon, Pa., the Pennsylvania Steel Company has acquired the interest of William Coleman Freeman of Lebanon in the Cornwall Ore Banks Company, as the organization controlling the famous Cornwall ore mines is known. The price paid was \$281,250. This purchase increases the previous large interest of the Pennsylvania Steel Company in these mines. The Lackawanna Iron & Steel Company is also interested with it, but the Pennsylvania Company has been steadily acquiring the interests long held by the Colemans.



## The Sherman Antitrust Law.

### No Probability of Its Amendment this Session.

WASHINGTON, D. C., December 21, 1909.—Notwithstanding the strong sentiment in many quarters that the Sherman antitrust law should be comprehensively amended at the earliest practicable date, it now seems probable that the present session of Congress will adjourn without action in either House upon the numerous amendatory propositions now pending. This does not mean that the Congressional leaders do not desire the amendment of the law, nor does it indicate any relaxation of the pressure on both Houses from various sources to obtain more or less comprehensive modifications of the statute; it means simply that, until certain provisions of the existing law have been authoritatively construed by the United States Supreme Court in important pending cases, the Administration is unwilling to recommend changes and the Congressional leaders cannot be induced to legislate.

#### Interests Favoring Amendments.

Three influential interests desire the amendment of the Sherman law—namely, the Administration, certain important industrial combinations, prominent among which is the United States Steel Corporation, and the organized workmen of the country as represented by the American Federation of Labor. The Administration desires, if possible, that the Sherman law shall be so liberalized that it shall not be illegal for a number of industrial corporations to enter into a combination for the purpose of reducing the cost of production and effecting other economies calculated to cheapen their products to the consumer, provided such combination does not seek the elimination of all competition; in other words, the President and Attorney-General would be glad to see the statute so amended as to make it clear that it does not prohibit the so-called "good trusts" from continuing their operations, without in any way weakening the authority of the law to curb and punish the "bad trusts." It is freely conceded that the problem here involved is an exceedingly difficult and delicate one, the solution of which will test the ability of the ablest lawyers upon the Judiciary committees of the two houses.

The President would have incorporated in his recent annual message his recommendations for these amendments had it not been that the United States Supreme Court will soon be called upon to construe the Sherman act in the cases brought by the Government against the American Tobacco Company and the Standard Oil Company. The necessity for deferring the amendment of the Sherman law until these important cases can be decided is obvious, but the period of the delay is not easily estimated. The hearing of the tobacco cases in the United States Supreme Court has been set for January 3, but no decision is expected until after the Easter recess, and it is possible that the case may be carried over, and the opinion withheld until the court reconvenes for the next October term. The appeal in the case of the Standard Oil Company has not yet been filed in the Supreme Court, but will be presented early in January. With the present crowded condition of the docket there is little prospect that it will be heard and decided this term, even should the Attorney-General unite with counsel for the defendant corporation in a motion to advance.

Under the circumstances, it would be folly to attempt to predict the future course of the movement to amend the Sherman law, and it would not be surprising should nothing be accomplished during the present Congress, which will expire March 4, 1911. It is more than probable, however, that the Congressional committees

will not wait for the final action of the Supreme Court before taking up the matter for consideration and important hearings may be held before the end of the present session. Much preliminary work must be done, especially if a serious attempt is to be made to pass a law during the short session beginning next December, which will embrace barely 60 legislative days.

#### Alms of Labor Leaders.

The object of the United States Steel Corporation and other combinations in seeking the amendment of the Sherman law is said to be substantially identical with that of the Administration. Organized labor, however, is urging an independent and characteristically unreasonable and selfish proposition—namely, the exemption of all labor organizations from the operation of the Sherman act. A provision to this effect was incorporated in the so-called Civic Federation bill, which was the subject of protracted hearings before the Judiciary Committees of the two Houses in the Sixtieth Congress. The labor leaders strongly urged the exemption and are preparing to make a vigorous campaign along the same lines when the matter is again taken up.

While a certain element in both Houses will be found to favor the labor leaders' programme, conservative lawyers in Congress are opposed to it, not only on its merits, but because they do not believe that such an exemption would be constitutional. Several States have enacted laws embodying similar exemptions in favor of farmers, laborers, &c., but up to the present time the United States Supreme Court has not been called upon to rule on the constitutionality of these particular provisions. It is significant that in all the measures thus far formulated for the amendment of the Sherman law great care has been exercised to draft the proposed labor exemption as a separate section in order that the entire amendatory statute shall not be declared invalid in the event the exemption itself is held to be unconstitutional.

#### Trial by Jury in Contempt Cases.

With the opening of the new Congress the leaders of organized labor have secured the introduction of a bill of much importance in view of the contempt proceedings now pending against Gompers, Morrison, Mitchell, *et al.*, growing out of the boycott of the Bucks Stove & Range Company. This measure, which has been introduced by Representative Sabath of Illinois, who was sent to Congress by a labor constituency, provides for the trial by jury of certain classes of contempt cases. Its text is as follows:

That any person or persons accused of violating or disobeying any preliminary, interlocutory or final order of injunction of any nature, not committed in the actual presence of any court or judge, which injunction issued out of or was entered by any court or judge of any court of the United States, shall, before any penalty, fine or imprisonment is imposed, be entitled to a trial by jury as to the guilt or innocence of such person or persons or for such offense; that is to say, in no case shall a penalty, fine or imprisonment be imposed in such courts, or by any judge thereof, for any contempt or alleged contempt (except as hereinbefore provided) until an opportunity has been given said person or persons to be heard by jury: Provided, That the judge who has issued said preliminary writ of injunction or any order or rule to show cause why a preliminary writ of injunction or any other in the nature of an injunction should not issue shall thereafter be disqualified from hearing or disposing of or from sitting in the trial of the matter so arising.

Sec. 2. That all acts or laws or parts of acts or laws in any wise conflicting with the provision of this act are hereby repealed.

Sec. 3. That this act shall take effect and be in force from and after its passage.

This measure has been referred to the House Judiciary Committee, upon which pressure is already being brought to force a favorable report. It is the best opinion here that the bill will not leave the committee in this Congress.

W. L. C.



## PERSONAL.

A. A. Fowler, New York, resident partner in Rogers, Brown & Co., will start on a trip to Africa soon after the holidays.

W. S. Pilling of Pilling & Crane, Philadelphia, and Edgar S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa., go on a trip to Egypt early in the new year.

Leonard Peckitt, president of the Empire Steel & Iron Company, has been elected president of the Eastern Pig Iron Association, to succeed Edgar S. Cook, and W. S. Pilling of Pilling & Crane, was re-elected secretary of the association at the regular meeting held December 15.

J. J. Spearman, Sharon, Pa., who has been connected with the iron trade most of his life and best known as a blast furnace owner in the Shenango Valley, entered upon his eighty-sixth year December 17.

James Merritt has become superintendent of the Federal Steel Foundry Company, Chester, Pa., thus returning to a position which he held some years ago.

Waddill Catchings, who was secretary for the receivers of Milliken Brothers, New York, has been appointed assistant to President August Heckscher of the Central Foundry Company, New York.

J. H. Ferguson has been appointed superintendent of Union Furnace at Ironton, Ohio, to succeed the late Charles Peters.

Clarence I. Beatty has resigned his position in the forge department of the New Castle Forge & Bolt Company, New Castle, Pa., to associate himself with his brother in the W. R. Beatty Machinery & Equipment Company, Pittsburgh. The latter recently moved from the House Building to 30 Carson street, S. S., Pittsburgh, where it has shop facilities for repairing second-hand machinery and the manufacture of dies and various specialties.

Frank L. Thompson, for several years purchasing agent of the Mesta Machine Company, Pittsburgh, has resigned to accept the position of office manager with the Keystone Sheet Metal Company, Economy, Pa., and is succeeded by William A. Keirn, whose duties continue to include publicity matters relating to Mesta products. Miss Olive Reeves of the purchasing department will act as assistant purchasing agent, being entirely familiar with such work.

George C. Davies, sales manager of the foundry iron department of Pilling & Crane, Philadelphia, Pa., will leave December 24 for a Western trip of several weeks.

Frank Salomon of the engineering staff of the Cologne office of Alfred H. Schutte left December 14 for Europe after a three months' stay in this country.

On account of the constantly increasing business of the Lawson Mfg. Company, Chicago, of which he is secretary and treasurer, W. H. Bennett finds it necessary to sever his connection with the Reading Hardware Company, with which he has been associated for 24 years. It is his intention, in addition to pushing the sale of Matchless hinges, to represent one or two reputable manufacturers, concerning which he will make an announcement later.

At a recent meeting of the directors of the Braeburn Steel Company, Braeburn, Pa., William Metcalf, Jr., was elected president, succeeding William Metcalf, Sr., deceased.

Theodore S. Beeson has resigned as chief chemist of the William Tod Company, Youngstown, Ohio, to accept the position of superintendent of the plant of the Pratt Engineering & Machine Company, Atlanta, Ga.

On December 17 the superintendents of Joseph E. Thropp's various operations met at his home at Earls-ton, Pa., and presented him with a gold headed cane.

Those present were: R. H. Kay, superintendent of the Kearney and Melrose coal and coke works; Hugh Smith, superintendent of Saxton furnaces at Saxton, Pa.; E. L. Grant, superintendent of Dungarvin ore mines, Dungarvin, Pa.; D. A. Karr, superintendent of Catocin ore mines at Thurmont, Md.; John M. Moore, superintendent of Antietam ore mines at Harper's Ferry, W. Va.; James H. Isett, superintendent of quarries; John T. Matt, store manager; H. J. Wagoner, chief clerk, and Geo. W. Hughes, general superintendent.

Ward W. Jacobs, Hartford, Conn., heretofore vice-president of the Shelby Iron Company, has been elected president of the company succeeding the late T. G. Bush, Birmingham, Ala.

## OBITUARY.

WALTER L. SANDFORD, manager of the Chicago office of E. C. Atkins & Co., Indianapolis, died at his home in Chicago, December 17, aged 55 years. He had been actively engaged in the hardware trade all his business life, beginning as a boy with Sargent & Co., New York. Going West he became buyer for Morley Brothers, Saginaw, Mich., and later for the Marshall-Wells Hardware Company, Duluth, Minn. He entered the employ of E. C. Atkins & Co. nine years ago as general salesman and later was promoted to the office of Chicago manager.

WILLIAM M. SAVAGE, president of Savage Brothers Company, machinery manufacturer, Chicago, died December 17, aged 85 years. He was one of the oldest residents of Chicago, his parents having moved from New Brunswick to that city in 1836 when he was two years old.

BENJAMIN WATSON, dealer in railroad supplies, died December 17 of tuberculosis at his home in Summit, N. J., aged 48 years. He leaves a widow.

JOSEPH CAMPBELL, president of the Diamond Saw & Stamping Works, Buffalo, N. Y., died November 29.

DR. CHARLES B. DUDLEY, chief chemist for the Pennsylvania Railroad Company, died December 21 at Altoona, Pa., of typhoid pneumonia, aged 68 years. He was one of the most prominent scientists in the country, and his death will be universally deplored. He was a graduate of Yale, a doctor of philosophy, president of the American Chemical Society, member of the Iron and Steel Institute, president of the American Society for Testing Materials, and was recently elected president of the International Society for Testing Materials at the meeting of the society held in Copenhagen. Dr. Dudley served in the One Hundred and Fourteenth New York Volunteers and was severely wounded in the battle of Winchester September 19, 1864.

CHARLES W. NORTON died at Mont Alto, Pa., December 8, of tuberculosis, aged 23 years. He was born in Minneapolis, Minn. He had been employed by the Riverside Metal Refining Company, Connellsville, Pa., about four years as manager, and made a very successful record. During his illness his brother, A. B. Norton, Jr., formerly employed in the Westinghouse plant at East Pittsburgh, has been manager of the Riverside Company.

FRANK I. CORDO, an official of the Griffin Car Wheel Company, died at Chicago, December 20, aged 48 years. He had been general purchasing agent of the company for some time, and more recently had held the office of director of review, a position in which he reviewed the work of all departments of the company. Mr. Cordo had been with the Griffin Car Wheel Company about 12 years, and prior to that time had been assistant general manager of the Chicago & Northwestern Railroad. He leaves a widow and two children.

## NEWS OF THE WORKS.

## Iron and Steel.

Keystone Furnace of the Reading Iron Company, Reading, Pa., has been blown out for repairs.

Of the rebuilding of his Earliston Furnace, at Earliston, Pa., Joseph E. Thropp writes as follows to the *Bulletin* of the American Iron and Steel Association: "I have taken down the old Everett Furnace and have near completion a new furnace 82 ft. high, 19 ft. 3 in. bosh and 12 ft. 9 in. hearth. I have also removed all the old wooden trestling and am putting in about 1500 ft. of track with concrete piers and steel girders and am introducing a complete tunnel system with electric trolleys and making other improvements so as to bring this plant up to a capacity of about 100,000 tons of foundry iron per year. I have recently purchased the property of the Morrisdale Coal Company in the Broad Top region, consisting of about 325 acres of coal land, partially developed, and upon which there are 18 coke ovens and mine equipment."

The Detroit Seamless Steel Tubes Company, Detroit, is building a one-story addition, 57 x 230 ft., to its plant on Jefferson avenue.

A new boiler of 400 hp. capacity or over will be purchased by the Silver Creek Furnace Company, Rome, Ga.

The Licking Rolling Mills, Covington, Ky., have been putting their equipment in shape for a season of rush work, and there is every likelihood that considerable new machinery will be required before the end of the coming year.

The Cambria Steel Company is arranging for a substation in connection with its new power system at Johnstown, Pa. Rotary converter, transformers, switchboard, &c., will be needed.

It is stated that the Syracuse, N. Y., plant of the National Tube Company, which has been idle two years, will begin operations in January.

The Lackawanna Iron & Steel Company has blown in the second of its Bird Coleman furnaces at Cornwall, near Lebanon, Pa., and is repairing North Cornwall Furnace.

The Clearfield Rolling Mill Company has been incorporated by A. W. Lee, H. H. Straw and S. C. Sherman of Clearfield, Pa. It has a nominal capital of \$5000.

## General Machinery.

The Weller Mfg. Company, Chicago, is having plans prepared for a large new plant.

The sledging roll plant of the Dunbar Stone Company, Detroit, Mich., will be improved and increased in capacity.

The car and locomotive repair shops of the Iowa Central Railroad at Marshalltown, Iowa, to which an addition was recently made, will be further extended. Some motor-driven tools and probably a crane will be required later.

The Joseph Reid Gas Engine Company, Oil City, Pa., is completing a new pattern shop, some new apparatus for which will be needed later. At present the old equipment will suffice.

The Connellsville Iron Works, Connellsville, Pa., which recently decided upon an extension of its plant, is reported to be figuring on additional machinery, some of which will be of heavier design than any of its present equipment. Electrical operation is proposed.

Construction of a municipal pumping plant is proposed at South Charleston, Ohio.

The Union Saw Works will establish a plant at Frankville, Pa. Machinery already owned by the company is to be utilized in the new location and additional tools purchased.

An exhaust steam turbine unit has been put in successful operation at the Industrial Works, Bay City, Mich. It consists of a 300-kw. single flow low pressure machine of the Parsons reaction type, receiving steam at 16 lb. absolute pressure and exhausting into 28 in. vacuum, direct connected to a 375 k. v. a. 60-cycle three-phase generator. The speed of the unit is 3600 rev. per min.

The Michigan Twist Drill Company, Detroit, Mich., has acquired possession of an existing plant and will equip it for the manufacture of its specialty.

The Erd Motor Mfg. Company, Saginaw, Mich., will build a large new plant for the manufacture of gasoline engines, the main building to be 50 x 150 ft. Quite a number of machine tools, presses, pneumatic appliances and other apparatus will be required, together with power equipment.

The capacity of the Union Radiator Company's plant at Johnstown, Pa., will be increased and additional power equipment provided.

Plans for a new plant are being prepared by the W. E. Leard Machine Company, Beaver, Pa., and considerable new apparatus will be required. Motor-drive will be adopted throughout, although some machines are to be operated in groups.

The Chalmers-Detroit Motor Company, Detroit, Mich., is getting ready to install a line of new alternating current motors for driving shop tools.

Some additional shop equipment is required by the Superior

Machine Tool Company, Kokomo, Ind., in extending the facilities of its plant.

A number of electric motors for operating machine tools will be purchased shortly by the Wheeler & Schebler Carburetor Company, Indianapolis, Ind.

Plans are being drawn by the New Era Gas Engine Company, Dayton, Ohio, for an addition to its plant. Equipment details have not yet been considered.

The Iroquois Iron Works, Buffalo, N. Y., is making some improvements in its crushing plant, the capacity of which it may be obliged to enlarge this season.

The Napier Iron Works, Centerville, Tenn., is expected to enlarge and improve its equipment.

The machine shop of the Blood Bros. plant at Kalamazoo, Mich., will be enlarged and furnished with considerable new equipment. Manufacture of automobile clutches will be particularly pushed.

The Mesta Machine Company, Pittsburgh, works at West Homestead, Pa., has recently made the following shipments: National Enamel & Stamping Company, St. Louis, Mo., two 26-in. sheet mills and one 26-in. tin mill; Buffalo Union Furnace Company, Buffalo, N. Y., one 57-in. type A Helander barometric condenser, one 12 and 20 x 16 in. dry air pump and 8-in. centrifugal pump for operating same; McKeesport Tin Plate Company, McKeesport, Pa., cold mill and complete roll equipment; Inland Steel Company, Indiana Harbor, repairs for a large Corliss engine, not a Mesta; besides other shipments of rolls, &c., to various iron and steel manufacturers.

## Foundries.

The Buffalo Carburetor Company, Detroit, Mich., has recently completed a foundry, with a capacity of 5 tons per day, adjoining its present buildings. This company was erroneously referred to in last week's issue as the Buffalo Cashmeter Company.

An addition for foundry work will be made to the plant of the Dayton Brass & Foundry Company, Dayton, Ohio. Some new equipment has already been provided for.

The Mansfield Brass Foundry, Mansfield, Ohio, has recently contracted for some new apparatus, to be used in an extension of its plant, and more will be required later.

A new foundry of small capacity is being built by W. T. Davoren, Denver, Colo.

The Kansas City Steel Scraper Company, Kansas City, Mo., will build a large foundry and manufacturing plant equipped with traveling cranes, hoists, conveyors and special machinery. Power will be furnished from a central station, including boilers, engine, generator, &c., and electric motors are to be installed throughout the shops.

The Vulcan Steam Forging Company, Buffalo, is completing plans for a one-story addition, 50 x 120 ft., to its plant on Rano street and the Delaware, Lackawanna & Western Railway, and is in the market for a 2000-lb. steam hammer.

The Miller Brass Company, Springfield, Mass., has had plans prepared for a new foundry.

The erection of a new machine shop, to be equipped with a full line of motor driven tools and pneumatic appliances, is contemplated by the United Engineering & Foundry Company at its Youngstown, Ohio, works. An increase in power capacity will also be needed in the near future.

The Gerson-Carey Foundry Company, Lansing, Mich., has started work on a new core oven and is laying plans for an addition to the plant which will involve the purchase of much new equipment.

The J. C. Kupferle Foundry Company, St. Louis, Mo., is interested in plans for a new plant, the exact nature of which is not stated. All machinery will be motor driven.

Two engine driven dynamos of 500 hp. each will be installed in the power plant of the American Steel Foundries Company at East St. Louis, Ill.

The Cherryvale Iron Works, Cherryvale, Kan., will purchase about January 1 a variety of shop and foundry equipment, including cranes, motors, shafting, &c.

The foundry of the Keller Brass Company, Grand Rapids, Mich., will be enlarged in capacity by the installation of improved apparatus for molding and finishing.

The Frankfort Brass Mfg. Company, Frankfort, Ind., successor to the Frankfort Brass Works, is about ready to commence operations and will make a specialty of brass, bronze and aluminum castings.

The Ford Motor Company, Detroit, Mich., is taking bids for a one-story foundry, 200 x 200 ft., to be erected on Jefferson avenue, between Brush and Beaubien streets, of structural iron and brick.

The Detroit Lubricator Company will soon award contract for a foundry building which it will erect adjoining its plant on Trumbull avenue, of brick and steel construction.

The Aluminum Casting Company of Cleveland, Buffalo and Detroit, have purchased a site of seven acres at Elmwood and Hertel avenues and the Erie Railroad, Buffalo, and will build an



extensive plant. A one-story foundry building, 120 x 275 ft., of structural iron and brick, will be erected at once, and other buildings next spring. Wm. H. Cooley, manager, 1095 Niagara street, Buffalo.

The Hockensmith Wheel & Mine Car Company, Penn Station, Pa., has doubled its boiler capacity and purchased engines and generators to add two-thirds more power to its plant. The company further expects to erect new shops, beginning early in the year; the main building is to be 50 x 250 ft., for a steel mine car plant, and other additions will be made in a short time. The demand for the company's annealed chilled wheels and mine cars has been steadily increasing during the last six years, since it built the present plant, which is three times the size of the former one. The company has been making mine car wheels and cars for the last 35 years.

#### Power Plant Equipment.

The Willamette Iron & Steel Works, Portland, Ore., is reported to have entered into a contract to manufacture Bailin water tube boilers for installations on the Pacific Coast.

The William Tod Company, Youngstown, Ohio, has received a contract from the city of Dallas, Texas, to furnish the pumping engine for the White Rock reservoir. The pump is to maintain head against 68 lb. and is to have a capacity of 20,000,000 gal. of water in 24 hours.

The Bessemer Gas Engine Company, Grove City, Pa., practically has its new building completed and will shortly commence to install therein cranes and miscellaneous machine tools, recently contracted for. The new structure is 130 x 275 ft., the steel being fabricated and erected by the Penn Bridge Company, Beaver Falls, Pa. It will be fitted with two 5-ton and one 25-ton Northern electric traveling cranes, lathes, planers, drill presses, &c., and is expected to be ready for operations in May of next year, when the concern will about double its capacity in gas engines, pumping powers, &c.

#### Bridges.

The Board of Public Works, Rome, N. Y., has let contract to Lay & Walpole, Oswego, N. Y., for construction of a steel bridge, 125 ft. in length, across the Mohawk River at East Bloomfield street.

#### Fires.

The Shelby Machine & Supply Company's plant, Shelby, N. C., was burned December 15, the loss being about \$15,000.

The engine house, warehouse, electrical and carpenter shops of the Adams-Spruce Mining Company, Eveleth, Minn., were destroyed by fire December 10. The loss is \$30,000.

The main mill of the Jewett Car Works, Newark, Ohio, was destroyed by fire December 20. The loss is estimated at \$150,000.

The old Tasker plant of the National Tube Company, New Castle, Del., was burned December 19. This plant has been idle for some time.

Fire destroyed the plant of the Athens Electric & Power Company, Athens, Mich., December 11.

The Royal Motor Works, Worcester, Mass., suffered a fire loss of \$6000 December 14.

The manufacturing plant of the Farmers' Handy Wagon Company, Saginaw, Mich., was burned December 14. Loss about \$90,000.

#### Hardware.

Ground will be broken about March 1 by the Grand Rapids Hardware Company, Grand Rapids, Mich., for a new hardware and implement factory.

The tool department of the West Mfg. Company, Columbus, Ohio, will be considerably enlarged. Control of the Kinnell Company has been acquired, and the latter's equipment will be consolidated with that of the new owners.

The Christy Knife Company, Fremont, Ohio, is arranging to build a two-story factory early next spring.

#### Miscellaneous.

The Pierce Arrow Motor Car Company of Buffalo, N. Y., has placed a second contract for new buildings with the Aberthaw Construction Company of Boston. The buildings contracted for the last week in September are now under roof, and the new contract is for an additional building four stories in height, 180 ft. long, and additions to the power plant, the work to be carried on through the winter and delivered for occupancy in the early spring. The new buildings match the rest of the plant in general design and are absolutely fireproof reinforced concrete construction throughout. The entire output of the Pierce factory is sold for a year ahead and the company is making every effort to increase its capacity.

The A. F. Oliver Mfg. Company, 60 Cherry street, Buffalo, was low bidder for the steel coal storage bins to be constructed at the water works pumping station, Buffalo.

The Detroit White Lead Works, Detroit, has let contracts for a five-story factory, 66 x 184 ft., and a boiler house, 30 x 33 ft., to be added to its plant on Milwaukee avenue.

The Russell Motor Axle Company, recently incorporated at Detroit, Mich., with a capital of \$100,000, will erect and equip a factory, probably on the Michigan Central Railroad near Joseph Campau avenue. Albert W. Russell is president.

### The Garry Iron & Steel Company.

At a meeting held December 18 of the directors and stockholders of the Garry Iron & Steel Company, at Cleveland, it was decided to remove the plant of the company from that city to Youngstown, Ohio. It was also decided at the meeting to submit to a vote of the stockholders a proposition to increase the capital stock of the company from \$300,000 to \$500,000 of common and \$200,000 of preferred stock, and it is assured that, after the necessary preliminary legal action has been taken, the increase of the capital stock will be voted. The company purchased a 12-acre tract of land in the Crab Creek District, lying west of the plant of the Reliance Edge Tool Company, and has also purchased the site and buildings of the George B. Sennett Company, Youngstown.

The plant will consist of six hot sheet mills, the sheets to be used in the finishing mills for the manufacture of roofing, eavestrough and conductor pipe, expanded metal and other specialties. The plant and buildings will be so arranged that at any time they can be added to for the doubling of the mills and product and the entire equipment will be new and modern. The officers of the Garry Iron & Steel Company are: George D. Wick, president; Samuel Siddall, vice-president and treasurer; Philip Wick, assistant treasurer; J. C. Wicks, secretary.

### The Ohio Iron & Steel Company.

The Ohio Iron & Steel Company, operating Mary Furnace at Lowellville, Ohio, has had under consideration for some time the building of an open hearth steel plant, consisting of six 50-ton open hearth furnaces, with blooming mill and finishing mills attached. At a meeting of its Board of Directors, held last week, a committee was appointed to investigate the cost of these contemplated improvements, which will be decided upon probably within the next 30 days.

On January 20, the stockholders will vote on a proposition for the issuance of \$3,500,000 of common stock and \$1,000,000 of preferred stock. The present capitalization is \$500,000, so that the new capitalization, if agreed upon, will consist of \$4,000,000 of common and \$1,000,000 of preferred stock. The shares are to have a par value of \$100, and the preferred stock is to pay a 7 per cent. cumulative dividend.

During the past year this company has made some improvements, installing a pig casting machine, raising the firebrick stoves up to 90 ft., altering the ore bins, &c., involving an expenditure of about \$200,000, so that its furnace is now in prime condition and is producing about 400 tons of iron per day.

**McClure Stove Contracts.**—G. W. McClure, Son & Co., Bessemer Building, Pittsburgh, Pa., have received a contract for 10 McClure hot blast stoves, each 22 x 100 ft., for the two new blast furnaces being built by the Bethlehem Steel Company at South Bethlehem, Pa. With the completion of these stoves, there will be a total of 22 stoves of the McClure type installed at the plant of the Bethlehem Company. G. W. McClure, Son & Co. have recently completed four 22 x 90 ft. stoves at the blast furnace of the Brier Hill Iron & Coal Company, Youngstown, Ohio, and four stoves, 22 x 95 ft., at the River Furnace of the Cleveland Furnace & Dock Company, Cleveland, Ohio. The firm has also recently completed a 20 x 95 ft. stove at the blast furnace of the Northern Iron Company, Port Henry, N. Y., and has under way at this plant a new stove of the same size and type.

The Executive Committee of the Bessemer Pig Iron Association has issued invitations for a dinner to be given at the Union Club, Cleveland, Ohio, Wednesday evening, December 29.



## The Iron and Metal Trades

Two sets of conditions must be taken into account in an estimate of the current iron market—those governing finished steel products and those connected with the foundry trade. The steel works have had an unexpected volume of new business in December, many of them, in fact, having sold considerably more material than they have shipped. On the other hand, the foundry iron trade, which represents important and diverse consuming interests, has shown continued quietness, with weakening in prices.

The buyers and sellers of foundry iron are engaged in one of their periodic efforts to find a basis for a new buying movement. It is evident that foundry iron prices, particularly Southern, overran the mark in some of the business done in October and November for the first and second quarters of 1910. As against \$15, Birmingham, paid for No. 2 in certain of those transactions, \$14 has been named in offerings by some makers in the past week.

Melters are apparently supplied with iron for the first quarter and a real buying movement may not start until January is well along. Some interest is beginning to be shown in iron for the second half of next year, however. The view of such consumers is that the tremendous consumption of steel must in time impart greater life to foundry products.

Southern cast iron pipe makers are reported to have bought about 25,000 tons of various grades of iron from Alabama furnaces.

In steel making iron there is further inquiry for delivery beyond the first half of next year. Eastern buyers have offered \$18.50 for basic iron for the second half, but makers hold off. One sale of 5000 tons of basic is reported at \$20, delivered in New York State, deliveries extending into the third quarter.

In the Central West and in the Chicago District buying of foundry iron has increased under the concessions recently made, and several round transactions are reported.

For Bessemer iron \$19, at furnace, is firmly maintained. The Steel Corporation is not expected to buy outside iron. As it has done for two years it is still shipping basic iron from the Pittsburgh District to its steel plants in New England and eastern Pennsylvania. Sales of 8000 to 10,000 tons of basic iron, including one lot of 6000 tons, are reported at \$17, at Valley furnace.

An important crucible steel interest has been in the market for a good tonnage of low phosphorus pig iron.

The reservations of non-Bessemer Lake Superior ores by Central Western furnace companies have been large. While Bessemer Lake Superior ores are certain to be 50c. a ton above the level of 1909—or \$5 for old range and \$4.75 for Mesaba Bessemer—the non-Bessemer advance is likely to be less, or from 30c. to 40c. The iron guarantees remain the same.

With all that has been said about the greatly preponderating activity of steel in the remarkable market movements of this year, that feature is still very marked. On nearly all products the steel rolling mills are largely sold up for the first half of 1910 and in many cases into the third quarter.

Rail orders include 20,000 tons for the Illinois Central placed with the Alabama mill. It is estimated that rail sales for 1910 are now fully 1,750,000 tons.

Car orders have increased in the past two weeks, and further good buying is expected in January. Car works are running at about 75 per cent. of capacity, shortened deliveries of steel preventing fuller operation.

In metals lead and tin continue to be the features. The former has advanced 30 points in 12 days. Tin has reached the highest point in two years at 33.80, as against 32.75 one week ago. Curtailment of copper production is actually under way.

## A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,  
Declines in Italics.

At date, one week, one month and one year previous.

	Dec.22, 1909.	Dec.15, 1909.	Nov.17, 1909.	Dec.23, 1908.
<b>FIG IRON, Per Gross Ton:</b>				
Foundry No. 2, standard, Philadelphia .....	\$19.00	\$19.00	\$19.00	\$17.25
Foundry No. 2, Southern, Cincinnati .....	17.25	17.25	17.75	16.25
Foundry No. 2, local, Chicago ..	19.00	19.00	19.00	17.35
Basic, delivered, eastern Pa. ....	<b>18.75</b>	18.75	18.50	16.75
Basic, Valley furnace .....	<i>17.00</i>	17.00	17.25	15.75
Bessemer, Pittsburgh .....	19.90	19.90	19.90	17.40
Gray forge, Pittsburgh .....	17.40	17.40	17.40	15.40
Lake Superior charcoal, Chicago ..	19.50	19.50	19.50	19.50
<b>BILLETS, &amp;c., Per Gross Ton:</b>				
Bessemer billets, Pittsburgh ..	<b>27.50</b>	27.50	27.00	25.00
Forging billets, Pittsburgh ..	31.00	31.00	31.00	27.00
Open hearth billets, Philadelphia ..	30.60	30.60	30.60	26.20
Wire rods, Pittsburgh .....	33.00	33.00	33.00	33.00
Steel rails, heavy, at mill .....	28.00	28.00	28.00	28.00

<b>OLD MATERIAL, Per Gross Ton:</b>				
Steel rails, melting, Chicago ..	17.25	17.25	17.25	15.50
Steel rails, melting, Philadelphia ..	<i>17.00</i>	18.00	18.00	17.50
Iron rails, Chicago .....	20.00	20.00	20.50	19.50
Iron rails, Philadelphia .....	20.50	20.50	21.00	21.25
Car wheels, Chicago .....	18.50	18.50	18.50	16.00
Car wheels, Philadelphia .....	17.50	17.50	17.50	16.00
Heavy steel scrap, Pittsburgh ..	<b>18.25</b>	18.25	17.50	17.00
Heavy steel scrap, Chicago .....	16.00	16.00	16.00	14.75
Heavy steel scrap, Philadelphia ..	<i>17.00</i>	18.00	18.00	17.50

<b>FINISHED IRON AND STEEL,</b>				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia ..	1.85	1.65	1.65	1.52
Common iron bars, Chicago .....	<b>1.60</b>	1.60	1.55	1.50
Common iron bars, Pittsburgh ..	1.70	1.70	1.70	1.50
Steel bars, tidewater, New York ..	1.66	1.66	1.66	1.56
Steel bars, Pittsburgh .....	1.50	1.50	1.50	1.40
Tank plates, tidewater, New York ..	1.71	1.71	1.71	1.76
Tank plates, Pittsburgh .....	1.55	1.55	1.55	1.60
Beams, tidewater, New York .....	1.71	1.71	1.71	1.76
Beams, Pittsburgh .....	1.55	1.55	1.55	1.60
Angles, tidewater, New York .....	1.71	1.71	1.71	1.76
Angles, Pittsburgh .....	1.55	1.55	1.55	1.60
Skelp, grooved steel, Pittsburgh ..	1.55	1.60	1.55	1.45
Skelp, sheared steel, Pittsburgh ..	1.60	1.65	1.60	1.50

<b>SHEETS, NAILS AND WIRE,</b>				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh ..	<b>2.40</b>	2.40	2.30	2.50
Wire nails, Pittsburgh .....	<b>1.85</b>	1.85	1.80	1.95
Cut nails, Pittsburgh .....	1.80	1.80	1.80	1.75
Barb wire, galv., Pittsburgh .....	<b>2.15</b>	2.15	2.10	2.40
<b>METALS, Per Pound:</b>				
Lake copper, New York .....	<b>13.75</b>	13.75	13.25	14.37½
Electrolytic copper, New York ..	<b>13.50</b>	13.50	13.00	14.12½
Spelter, New York .....	6.30	6.40	6.30	5.15
Spelter, St. Louis .....	6.15	6.25	6.15	5.00
Lead, New York .....	<b>4.70</b>	4.60	4.40	4.20
Lead, St. Louis .....	<b>4.67½</b>	4.52½	4.25	4.05
Tin, New York .....	<b>33.80</b>	32.80	30.75	29.20
Antimony, Hallett, New York ..	8.25	8.25	8.25	8.12½
Nickel, New York .....	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York .....	\$3.84	\$3.84	\$3.84	\$3.89

\* These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Structural Shapes.**—I-beams and channels, 3 to 15 in., inclusive, 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

**Plates.**—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered  $\frac{1}{4}$ -in. plate. Steel plates over 72 in. wide must be ordered  $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide, ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete circles.....	.20
Boiler and flange steel plates.....	.10
"A. B. M. A." and ordinary firebox steel plates.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

**Sheets.**—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, \$1.70 per square. Galvanized roofing sheets, No. 28, \$3 per square, for  $2\frac{1}{2}$ -in. corrugations.

**Wrought Pipe.**—Following are the regular discounts on merchant pipe, subject to the usual additional discounts to larger buyers:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
$\frac{1}{8}$ and $\frac{1}{4}$ in.....	71	55	65	
$\frac{3}{8}$ in.....	72	58	66	52
$\frac{1}{2}$ in.....	75	63	69	57
$\frac{3}{4}$ to 6 in.....	79	69	73	63
7 to 12 in.....	74	59	68	53
Plugged and Reamed.				
1 to 4 in.....	77	67	71	61
Extra Strong, Plain Ends.				
$\frac{1}{4}$ to $\frac{3}{4}$ in.....	64	52	58	46
$\frac{1}{2}$ to 4 in.....	71	59	65	53
$\frac{3}{4}$ to 8 in.....	67	55	61	49
Double Extra Strong, Plain Ends.				
$\frac{1}{4}$ to 8 in.....	60	49	54	43

**Boiler Tubes.**—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to $1\frac{1}{4}$ in.....	49	43
$1\frac{1}{4}$ to $2\frac{1}{4}$ in.....	61	43
$2\frac{1}{4}$ in.....	63	48
$2\frac{1}{2}$ to 5 in.....	69	55
6 to 18 in.....	60	43

$2\frac{1}{2}$  in. and smaller, over 18 ft., 10 per cent. net extra.

$2\frac{1}{2}$  in. and larger, over 22 ft., 10 per cent. net extra. To destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

**Wire Rods.**—Bessemer, open hearth and chain rods, \$33.

**Steel Rivets.**—Structural rivets, 2.15c., base; boiler rivets, 2.25c., base, subject to usual extras.

## Chicago.

FISHER BUILDING, December 22, 1909.—(By Telegraph.)

Specifications for steel have reached the highest aggregate tonnage ever known in this market, extending on the principal lines for several months into the future with unspecified contracts reaching still farther ahead. Established buyers who have anticipated their requirements are having no serious difficulty in getting deliveries for their consumptive needs, especially since they safeguarded their interests by heavy specifications last fall in advance of their actual requirements. The occasional buyer who comes into the market for a small lot finds the situation very embarrassing as he has to pay the top price for prompt shipment from Eastern mills unless he is fortunate enough to find a local mill in position to make prompt delivery. Even in this he must still pay the top price as orders for carload lots of bars have been taken at figures as high as 1.85c., and 1.90c., for prompt shipment. The larger steel mills, however, are loyal to their regular customers and refuse all business of this character. It is embarrassing to turn business away, but the rule seems to be generally followed not to take business at a higher price that will interfere with deliveries already under contract. In structural shapes, the greatest delay in deliveries is on small sections. Some of the mills represented in this market are able to give prompt deliveries on heavy beams and channels, but on light angles and sections all the mills are booked with specifications several months

ahead and this is especially true of the Western mills. Plate business in both universal and sheared plates seems to accumulate faster in the West than in the East. The bar iron mills and those rolling hard steel bars are not booked so far ahead in this district but are doing a good business. Old material is steady and is expected to go over the holidays without any material change in values although dealers express confidence that prices will be higher next month.

**Pig Iron.**—The market for Northern iron continues steady, with production and consumption so evenly balanced that no weakness has become manifest in the price, and there is no spot trading of the kind so conspicuous in Southern grades. Inquiries are pending for two or three lots of malleable Bessemer, one for 1000 and another for 2000 tons, but buyers have not shown any interest thus far in deliveries of Northern foundry beyond the first half, and it is not expected that much will be done in that line until next month. It is reported here that there has been an active demand in the Cleveland District in the past week or 10 days which has taken care of stocks of basic and foundry iron in the Valleys. One inquiry pending in Chicago for Northern iron is for 1000 tons for delivery at Akron, Ohio. In Southern foundry grades the market continues weak, and some resale lots have been closed out as low as \$18, Chicago delivery, for No. 2 foundry. This weakness in spot iron is extending slowly into deferred shipments, and some of the Southern interests are willing to do \$14, Birmingham, for first quarter and first half, although \$14.50 is the lowest figure that other Southern furnaces will consider, while some continue to ask \$15. An encouraging feature in the market for Southern irons, which may indicate that the lowest point has been passed, is that the regular agencies have more inquiries this week than for a month, and some of these inquiries run as high as 1000 and 2000 tons. This would lend color to an inference that the brokers who are handling resale iron are no longer monopolizing the market and supplying the current demand, although it may be due to the fact that the Southern furnace interests are more disposed to meet the buyers half way in the matter of price. A tentative inquiry for 3000 to 5000 tons of Southern basic, second quarter, for St. Louis delivery, which has been in the market for several weeks, has not been accepted at the price the buyer is willing to pay. It is understood here that Southern pipe interests have purchased 25,000 to 30,000 tons, but particulars regarding delivery have not reached this market. Locally, large foundry buyers have been very indifferent the past month, but it is understood that they have quietly taken care of offerings of resale iron which have come into the market at figures below \$14. This business in the past week reached a considerable tonnage of December and January iron, but the details regarding price and quantity have been closely guarded. The following prices are for December delivery, f.o.b. Chicago:

Lake Superior charcoal.....	\$19.50 to \$20.00
Northern coke foundry, No. 1.....	19.50 to 20.00
Northern coke foundry, No. 2.....	19.00 to 19.50
Northern coke foundry, No. 3.....	18.50 to 19.00
Northern Scotch, No. 1.....	19.00 to 19.50
Southern coke, No. 1.....	18.85 to 19.35
Southern coke, No. 2.....	18.35 to 18.85
Southern coke, No. 3.....	17.85 to 18.35
Southern coke, No. 4.....	17.60 to 18.10
Southern coke, No. 1 soft.....	18.85 to 19.35
Southern coke, No. 2 soft.....	18.35 to 18.85
Southern gray forge.....	17.35 to 17.85
Southern mottled.....	17.10 to 17.60
Malleable Bessemer.....	19.00 to 19.50
Standard Bessemer.....	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%.....	20.40 to 20.90
Jackson Co. and Kentucky silvery, 8%.....	21.40 to 21.90
Jackson Co. and Kentucky silvery, 10%.....	22.40 to 22.90

(By Mail.)

**Billets.**—There are many inquiries pending in this market for forging billets, but the local mills are all short of steel for their own finishing departments, and all the steel interests west of the Alleghenies seem to be in the same condition, creating a situation which is very embarrassing to Western consumers of billets.

**Rails and Track Supplies.**—Miscellaneous orders for standard rails amounted to 21,000 tons last week, the largest order being for 11,000 tons. Specifications for tie plates and track supplies continue in excess of the capacity of the Western mills, which will scarcely be able during the coming winter to catch up with the demand for track material. Western railroads have only been able to make the most necessary repairs since they began buying material last summer, and their roads will need a general overhauling next year to bring them into proper condition. We quote standard railroad spikes at 1.80c., base; track bolts and square nuts, 2.30c. to 2.50c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., \$26; 30 to 35 lb., \$26.75; 16, 20 and 25 lb., \$27; 12 lb., \$28, Chicago, less 50c. a ton on lots of 500 tons and \$1 a ton on lots over 500 tons.

**Structural Material.**—The long pending contract for the Boston department store has finally been let to John Griffiths & Son, who are having the fabricating done by the South Halsted Street Iron Works, the structural material coming from the Carnegie Steel Company. The Comiskey



ball park contract, about 900 tons, which has also been pending for some time, has gone to George W. Jackson, Inc., Chicago. Aside from these items no large contracts are reported. The American Bridge Company has booked 538 tons for an addition to the Chicago Title & Trust Company Building, and about 500 tons for a second bag house at the Mammoth smelter at Kennett, Nev. Considerable new business is coming into view for next year, including several steel buildings in Chicago. The structural mills in the West are booked far ahead with specifications, and this appears to be true of all the important mills of the leading interest, but it is understood that some of the Eastern independent mills represented in this market are able to give prompt delivery. The general situation in structural material is proving embarrassing to investors and in some cases they have authorized the use of material from store to hasten the completion of work in hand. We quote plain material from mill, 1.78c. to 1.88c., Chicago; from store, 2c., Chicago.

**Plates.**—Nothing of interest has developed in this branch of the trade the past week. The Western mills are all booked far ahead with actual specifications on both sheared and universal plates, and there will be great difficulty in taking care of steel car business next year. Prices remain unchanged. We quote mill prices at 1.78c. to 1.88c., Chicago; store prices, 2c., Chicago.

**Sheets.**—Relatively more new business is coming out in sheets than in any other line of finished products, as there seems to be many buyers who have not yet covered their requirements for the first half. We quote mill prices as follows, Chicago: No. 10 blue annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

**Bars.**—Actual new business has been light this month, but specifications are very heavy, covering contracts that would have expired at the end of the year, as well as the current needs of consumers. Actual specifications now in hand will occupy the mills for several months, and the occasional buyer who comes in with a new order for a small lot finds all the world against him. The large mills, which are loaded up with business at current contract prices, will not discriminate against their regular customers by taking new business at a premium and giving a preference in delivery. The buyer must shop around until he can find a mill that can work in the order in its rolling schedule. For small lots of a carload or two of soft steel bars as high as 1.85c. and 1.90c. has been paid for prompt shipment from mill. As a rule buyers of small lots have to depend upon deliveries from store. Hard steel bars continue firm and the bar iron mills have a comfortable supply of business. Subject to the usual delay in delivery on soft steel bars, we quote as follows: Soft steel bars, 1.68c. to 1.78c.; bar iron, 1.60c. to 1.65c.; hard steel bars rolled from old rails, 1.58c. to 1.65c., all Chicago.

**Merchant Steel.**—Large consumers of merchant steel have generally covered their requirements for the first half. The demand is very good from the machinery trade and also from jobbers and supply houses. Prices remain unchanged.

**Rods and Wire.**—Orders and specifications from the manufacturing trade for rods and wire have been unusually heavy the past fall, and the mills are booked several months ahead with specifications, the manufacturing trade being the only line of wire products on which the mills are behind, and this being due chiefly to the fact that buyers have played safe by anticipating their requirements. Plain and barb wire and wire nails were advanced 5 cents December 11, with a corresponding readjustment on special wire products. Rods are quoted at \$36, Chicago. Jobbers' carload prices, which are quoted to manufacturing buyers are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.23c., all Chicago.

**Cast Iron Pipe.**—Trade in this line is in the halting stage that precedes the holidays. No lettings of moment are reported for the past week, although bids have gone in for 2500 tons at Minneapolis, Minn. Inquiries for next year are becoming more frequent, and many of them will soon develop into tangible business. The transcontinental railroads did not authorize any readjustment, at their recent meeting in Chicago, in freight rates to the Pacific Coast. It is understood, however, that all the complaints regarding iron and steel rates have been redocketed by the transcontinental freight bureau and will be considered again at a meeting in March.

**Metals.**—The local copper market remains steady with no change in prices. Spelter, however, continues weak, with prices gradually receding on a small volume of actual business, as consumers have been persistent the past month in remaining out of the market excepting for immediate requirements. On carload lots, Chicago delivery, the market is nominally 6.20c., but is weak at this figure and on an actual purchase of a round lot, this price could be shaded. Another advance of 10c. in lead has followed the advance of 15c. last week. Tin is also higher. We quote as follows:

Casting copper, 13 $\frac{1}{4}$ c.; lake, 13 $\frac{3}{4}$ c., in carloads, for prompt shipment; small lots,  $\frac{1}{4}$ c. to  $\frac{3}{4}$ c. higher; pig tin, car lots, 33 $\frac{3}{4}$ c.; small lots, 35c. to 35 $\frac{1}{2}$ c.; lead, desilverized, 4.65c. to 4.75c., for 50-ton lots; corroding, 4.90c. to 5c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 6.20c. to 6.25c.; Cookson's antimony, 10 $\frac{1}{2}$ c., and other grades, 9 $\frac{3}{4}$ c. to 10 $\frac{1}{4}$ c.; sheet zinc is \$8 f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13 $\frac{1}{2}$ c.; copper bottoms, 11 $\frac{1}{2}$ c.; copper clips, 13c.; red brass, 12 $\frac{1}{2}$ c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4 $\frac{1}{2}$ c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

**Old Material.**—The market for scrap is very quiet this week, and practically no business is being done excepting to dispose of small lots on track. Prices are nominally firmer, as dealers are confident that better values will be realized after the first of the year, but consumers have generally accumulated large stocks and on current offerings will not pay any more than the general level of prices that has prevailed the past month. This applies particularly to the steel grades and rolling mill material. Cast scrap is lower in sympathy with Southern iron, but is not plentiful. Borings and turnings are firm. The Santa Fé sold only a small part of the 5000 tons offered last week on its list, as the prices bid were not considered satisfactory, although they are in line with the prices quoted in this report and in a few cases higher. The Illinois Central offered a round lot of car wheels last week which went at \$19 to a consumer, to which switching charges would have to be added for delivery. The following prices are per gross ton, delivered Chicago:

Old iron rails.....	\$20.00 to \$20.50
Old steel rails, rerolling.....	18.00 to 18.50
Old steel rails, less than 3 ft.....	17.25 to 17.75
Relaying rails, standard sections, subject to inspection.....	23.50 to 24.50
Old car wheels.....	18.50 to 19.00
Heavy melting steel scrap.....	16.00 to 16.50
Frogs, switches and guards, cut apart.....	16.00 to 16.50
Shoveling steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$17.50 to \$18.00
Iron car axles.....	21.50 to 22.00
Steel car axles.....	20.50 to 21.00
No. 1 railroad wrought.....	14.75 to 15.25
No. 2 railroad wrought.....	13.75 to 14.25
Springs, knuckles and couplers.....	14.75 to 15.25
Locomotive tires, smooth.....	18.50 to 19.00
No. 1 dealers' forge.....	12.50 to 13.00
Steel axle turnings.....	12.00 to 12.50
Machine shop turnings.....	10.50 to 11.00
Cast and mixed borings.....	7.50 to 8.00
No. 1 busheling.....	12.75 to 13.25
No. 2 busheling.....	9.75 to 10.25
No. 1 bolters, cut to sheets and rings.....	11.50 to 12.00
No. 1 cast scrap.....	14.50 to 15.00
Stove plate and light cast scrap.....	12.50 to 13.00
Railroad malleable.....	15.00 to 15.50
Agricultural malleable.....	13.00 to 13.50
Pipes and flues.....	11.50 to 12.00

## Cleveland.

CLEVELAND, OHIO, December 21, 1909.

**Iron Ore.**—Ore reservations continue to be made. Considerable tonnage, including a few round lots of non-Bessemer, was allotted to furnace interests during the week. With the expectation of a heavy demand for pig iron the coming year, many of the consumers are reserving considerably more ore than they did a year ago. The merchant ore firms still defer the fixing of ore prices, and it is now improbable that any action will be taken until after the holidays. When the price question is definitely settled it is expected that a heavy buying movement will be started. No change appears to have developed in the feeling among the ore men regarding the proposed advance in prices. We quote present prices at Lake Erie docks, per gross ton, as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

**Pig Iron.**—The market has shown a little more activity. Quite a number of inquiries have come in for foundry iron, ranging from 200 to 1000 tons, some being for the entire year, and while many of these are regarded as market feelers, more tonnage has been sold than for several weeks. The market has shown more of a softening tendency for several days and some of the smaller consumers seem to feel that they may be able to buy at somewhat lower prices now than they could after the first of the year, as it is believed that a buying movement in January will stiffen up prices. The most important sale was 2000 tons of No. 3 foundry to the local plant of the leading pipe interest for January and February delivery. This sale is understood to have been made at a price slightly below \$17.25, delivered, which is equivalent to less than \$16.35, Valley furnace, for No. 3, a Valley maker having made the sale. This was the first inquiry in several weeks large enough to test the market, and it brought out a price lower than the usual quotations. Local furnaces quoted a price of \$17.50, delivered. One interest reports sales of foundry and malleable aggregating about 2000 tons for shipment from an Ohio furnace, and a local furnace sold several lots of 500 tons and under for first quarter and first half delivery. A local



interest that had an inquiry out last week for 2500 tons of Bessemer, as far as can be learned, has not yet bought. Among the inquiries pending is one from the Lake Shore Railroad for 400 tons of Nos. 1 and 2 foundry, for spot shipment for its Elkhart shops, and one for 300 tons of No. 2 foundry from Erie, Pa. Local furnace interests have shaded their price on No. 2 from \$18.25 to \$18, delivered, Cleveland, and a good sized inquiry might bring out a slightly lower price. While No. 2 foundry is quoted at \$17, Valley furnace, for prompt shipment and first quarter, some producers continue to adhere firmly to \$17.25. For prompt delivery we quote, delivered, Cleveland, as follows, these prices also applying to the first quarter, except in the case of Jackson County silvery, for which an advance of \$1 a ton is asked for delivery after January 1:

Bessemer .....	\$19.90
Northern foundry, No. 1 .....	\$18.40 to 18.65
Northern foundry, No. 2 .....	17.90 to 18.15
Northern foundry, No. 3 .....	17.40 to 17.65
Gray forge .....	17.40 to 17.65
Southern foundry, No. 2 .....	18.35 to 18.85
Jackson County silvery, 8 per cent. silicon .....	20.55

**Coke.**—The market is quiet on both grades. Furnaces that have not yet bought are holding off with the expectation of getting slightly lower prices. We quote standard Connells-ville furnace coke at \$2.70 to \$2.75 per net ton, at oven, for spot shipment, and \$2.75 to \$2.85 for the first half. Connells-ville 72-hour foundry coke is held at \$3.25 for spot shipment and \$3.25 to \$3.50 for the first half.

**Finished Iron and Steel.**—As was expected with the approach of the holiday season and inventory taking time, the demand for various finished products has fallen off. Some of the mill agencies report the receipt of heavy specifications from some of their customers who had not previously specified to the full amount of their contracts, that expire January 1, but with these exceptions business has been light as compared with the previous weeks. With the heavy tonnage ordered in the past few weeks, no improvement in deliveries on steel bars can be looked for for some time. The only improvement on deliveries reported is on structural material. Specifications on shapes have been gradually falling off with the finishing up of small outside construction work, and some of the mills expect to be able to make fairly good deliveries by early spring. On some structural work that has come up this month fabricators have been quoting low prices, being able to do so because of having contracts for low priced material, that expire January 1. The demand for steel bars is more active than for other finished lines, and consumers are paying a premium of \$2 and more a ton for prompt delivery. For future delivery the price of 1.50c., Pittsburgh, is now being generally quoted as the minimum. The demand for plates for early delivery is holding up well. One mill that was able to take on some additional tonnage, because expected specifications were not forthcoming, reports that it booked orders for 7000 to 10,000 tons in a few days, and that it cannot now promise shipments within four to six weeks. This tonnage for early delivery was taken at 1.60c., Pittsburgh, for car lots, and 1.70c. for less than car lots. The American Shipbuilding Company has taken an order from the Anchor Line for a package freight boat, making 16 boats that this company has under contract for 1910 delivery. More boats are being figured on, and the lake shipbuilders expect a very busy season. The demand for sheets continues fairly active and deliveries are getting further behind. Mills able to make prompt shipments are asking a premium of about \$2 a ton. The demand for iron bars is only fair. Prices remain stationary, at 1.60c. to 1.65c., Cleveland. The lower price might be shaded on good orders for outside shipment. Warehouse business with jobbers continues good, although not so heavy as early in the month.

**Old Material.**—The market continues dull and weak, but dealers feel that the bottom has been reached, and that there will be more activity immediately after the first of the year. Brokers expect somewhat firmer prices to prevail soon, and some who have done little buying during the past few weeks are now disposed to contract for tonnage. The demand from consumers is light. Both the local steel and iron mills are well filled up and are holding back shipments on contracts. Sales of small lots to consumers can be made only at low prices. Yard dealers have large stocks on hand. Prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails .....	\$16.25 to \$16.75
Old iron rails .....	20.00 to 20.50
Steel car axles .....	20.50 to 21.00
Old car wheels .....	17.00 to 17.50
Heavy melting steel .....	16.00 to 16.50
Relaying rails, 50 lb. and over .....	22.50 to 23.50
Agricultural malleable .....	14.50 to 15.00
Railroad malleable .....	17.00 to 17.50
Light bundled sheet scrap .....	11.00 to 11.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles .....	\$21.00 to \$21.50
Cast borings .....	8.75 to 9.00
Iron and steel turnings and drillings .....	10.50 to 10.75
Steel axle turnings .....	12.00 to 12.50
No. 1 busheling .....	14.00 to 14.50
No. 1 railroad wrought .....	16.75 to 17.25
No. 1 cast .....	14.50 to 15.00
Stove plate .....	12.00 to 12.50
Bundled tin scrap .....	11.00 to 11.50

## Pittsburgh.

PARK BUILDING, December 22, 1909.—(By Telegraph.)

**Pig Iron.**—A company having contracts for supplying the Pittsburgh Steel Company and other consumers with basic iron has recently appeared in the market as a purchaser of basic iron, and has taken on 8000 to 10,000 tons of basic to apply on such contracts at \$17, Valley furnace. Aside from this, little has been done, the new demand for Bessemer, foundry and mill iron being very quiet. None of the large steel companies is in the market for Bessemer or basic for next year, being pretty well covered through the first quarter. We quote standard Bessemer iron, \$19, for delivery over first half of next year; basic, \$17, for delivery in first quarter; malleable Bessemer, \$17.25; No. 2 foundry, \$17, and gray forge, \$16.50, all at Valley furnace, the freight rate to the Pittsburgh District being 90c. a ton.

**Steel.**—Some consumers of billets and sheet and tin bars who bought heavily last May and June, when prices of steel were considerably lower than they are now, find they can spare small lots, most of which is being offered through brokers and at prices slightly less than steel makers would name. The quantity thus available is not heavy, and it would be impossible to contract for any large lots of steel at the prices named on these small parcels. This condition is only temporary, and is not expected to last through January. The American Sheet & Tin Plate Company is specifying at present with the Carnegie Steel Company for about 110,000 tons of sheet and tin bars per month, so that the latter company will not have much steel to offer to outside sheet and tin plate mills for first quarter. Steel mills quote \$27.50 for Bessemer billets and \$28 to \$28.50 for open hearth, maker's mill. On sheet and tin bars for first quarter \$29, at maker's mill, is regarded as the market. Forging billets are scarce and firm at \$31 to \$32, maker's mill, and small lots for prompt shipment are sold at the latter price.

(By Mail.)

The situation is quieter, as regards new business, than at any time in the past three or four months. Exceptions to this are sheets, tin plate and merchant pipe, the bookings of the leading interests in these lines so far this month having been very heavy. The pig iron market continues quiet, and attempts to stimulate prices on basic iron, which have been weak for some time, are without effect. Reports that a leading steel casting concern had bought a round tonnage of basic iron for delivery in first quarter at \$17.25, at Valley furnace, are absolutely denied by the company. Offerings of Bessemer and open hearth steel billets and sheet and tin bars are freer than for some time, and prices are a shade easier. It is stated, however, that this position is only temporary, and that by January 15, or before, the situation in steel will be as tight as ever. There is a heavy demand for steel scrap and the market is firm. On the other grades, however, there is not much doing, and they are expected to remain quiet until after the turn of the year. The new demand for furnace and foundry coke has quieted down, most consumers now being covered for first half of next year.

**Ferromanganese.**—There is little new inquiry, most consumers being covered through first quarter and some through first half of next year. Prices seem to be a trifle weaker, and we quote 80 per cent. foreign at \$44.50 to \$45, seaboard, for first quarter and first half, and about \$46 for second half, the freight rate to the Pittsburgh District being \$1.95 a ton.

**Ferrosilicon.**—We note sales of two cars of about 60 tons of 50 per cent. for Western shipment at a price equal to \$62.50, Pittsburgh. The market is weaker and new inquiries are quiet. We quote 10 per cent. at \$23.90; 11 per cent., \$24.90; 12 per cent., \$25.90, and 50 per cent., \$62.50 to \$63, Pittsburgh, for prompt shipment.

**Muck Bar.**—The market is firm, with a probability that prices on high grade bars may be higher after the first of the year. There is little new inquiry. While the concerns that buy muck bar in the open market are few, yet there are only one or two sources of supply. Northern forge iron is about \$17.40, Pittsburgh, and adding \$13 to this for conversion makes a price of \$30.40 for muck bar, which makers claim they should have. We quote best grades of muck bar, in random lengths, made from all pig iron at \$30, and light bars, cut to lengths, at \$30.25, Pittsburgh.

**Wire Rods.**—We note two sales of about 400 tons of Bessemer rods for shipment on the basis of about \$33, makers' mill. While the inquiry is not heavy the market is firm, the two leading makers being practically out of it as sellers. We continue to quote Bessemer, open hearth and chain rods at \$33, Pittsburgh.

**Skelp.**—This is the dull season of the year in the pipe trade, and it is reflected in skelp, the new demand for which is quiet. The mills are catching up on contracts and able to make prompt shipments than for some time. Prices also are a trifle easier, one or two mills seeking business on certain sizes on which they can make prompt shipments. We have revised our prices and now quote grooved steel skelp, 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.;

grooved iron skelp, 1.80c. to 1.85c., and sheared iron skelp, 1.90c., f.o.b. maker's mill, Pittsburgh.

**Steel Rails.**—No important contracts for standard sections were taken by the Carnegie Steel Company last week, but it received quite a few orders for small lots, ranging from 300 tons up to as high as 1500, and booked new orders for about 2500 tons of light rails. It is stated that very few railroads have bought enough rails to cover their requirements for 1910, and for this reason a more liberal buying movement is expected early in the new year. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., \$32; 12 to 14 lb., \$29; 16, 20 and 25 lb., \$28; 30 and 35 lb., \$27.75, and 40 and 45 lb., \$27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at \$28, at mill.

**Plates.**—Orders for steel cars continue to be placed, but not as freely as some time ago. In the past week the New York Central placed 2000 all steel gondola cars with the American Car & Foundry Company, and the Atlantic Coast Line placed 300 steel underframe flat cars with the South Baltimore plant of the Standard Steel Car Company, while the Philadelphia & Reading Railroad is in the market for 500 steel underframe gondolas and 1000 steel underframe box cars. With orders already booked and in sight, the Pressed Steel Car Company has enough orders on its books to run practically full at its Woods Run and McKees Rocks steel car plants up to June. Specifications against contracts for plates are coming in freely, and the leading mills are from two to three months back in deliveries. Prices are firm, and we quote  $\frac{1}{4}$ -in. and heavier plates at 1.55c. in large lots and 1.60c. in small lots.

**Structural Material.**—New inquiries have quieted down somewhat, but this is usually the case at this season of the year. The McClintic-Marshall Construction Company has taken 1000 tons for the sheet mill buildings for the Garry Iron & Steel Company, which is to remove its plant from Cleveland to Youngstown. Deliveries of plain material from the mills are reported to be better than for some time, and specifications against contracts booked some months ago, when prices were lower than they are now, are coming in very freely this month. We quote beams and channels up to 15-in. at 1.55c., at mill, and small lots for spot shipment at 1.60c. to 1.65c., at mill.

**Tin Plate.**—A number of the leading mills are practically sold up on their entire output for the first half of next year. The American Sheet & Tin Plate Company this week is operating 80 per cent. of its serviceable tin mill capacity. Prices are firm and we continue to quote 100-lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh, for delivery in first half of next year.

**Sheets.**—There is apparently no let up in the new demand for sheets, while specifications on contracts continue to pour into the mills at an unprecedented rate. A leading sheet interest has taken 500 tons of iron sheets to cover the new buildings of the Republic Iron & Steel Company, at Youngstown, Ohio. Several of the leading sheet mills are pretty well sold up on all the sheets they can make for the first half of 1910, and are turning down desirable orders every day. Prices on sheets are firm, and we quote: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at \$1.70 per square for painted and \$3 for galvanized, 2 $\frac{1}{2}$ -in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

**Bars.**—Little new business is being placed in either iron or steel bars, but buyers are specifying freely against contracts booked some time ago, most of which were taken at lower prices than are ruling now. All the leading steel bar mills are much behind in shipments, having engagements on their books for practically their entire output of bars for the first three months of next year. The mills rolling iron bars are also well sold up, but slightly earlier deliveries can be made than on steel bars. On contracts from regular customers the mills are still entering orders for steel bars at about 1.45c., at mill, for delivery in first and second quarters of next year. We quote iron bars at 1.70c. to 1.75c., Pittsburgh, for reasonably prompt shipment.

**Hoops and Bands.**—New business this month has been light, but specifications against contracts, some of which expire December 31, are coming in freely. We quote steel hoops for forward delivery at 1.50c. to 1.55c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are firm at 1.45c. to 1.50c., on contracts for forward delivery, and 1.55c. to 1.60c. for reasonably prompt shipment.

**Spelter.**—Prices have remained about stationary the past week. We quote prime grades of Western spelter at 6.22 $\frac{1}{2}$ c., East St. Louis, or 6.35c., Pittsburgh. It is possible that on a firm offer and on desirable tonnage 6.20c., East St. Louis, might be done.

**Spikes.**—Orders from the railroads have not been com-

ing in as freely as anticipated, but there is a good run of small orders, and the spike makers are pretty well filled up with business for the next two or three months. We quote standard sizes of railroad spikes,  $\frac{1}{2}$  x 9-16 in. and larger, at \$1.80 to \$1.85 for first quarter. Boat spikes are firm, at \$1.80, base, and small railroad spikes at \$1.80, base. These prices are for carload and larger lots, 10c. per keg advance being charged for small lots.

**Shafting.**—Most consumers of shafting covered their requirements before the last advance in prices was made, and specifications against these orders are coming in freely. The new demand is light. Present discounts on shafting are being firmly maintained on the basis of 55 per cent. off in carload and larger lots, and 50 per cent. off in less than carload lots, delivered in base territory.

**Rivets.**—A meeting of the rivet makers was held in New York City last week, but no change in prices was made. The new demand for rivets is only fair, but consumers are taking out material freely on orders placed some time ago. We quote: Structural rivets,  $\frac{1}{4}$  in. and larger, 2.15c., base; cone head boiler rivets,  $\frac{1}{4}$  in. and larger, 2.25c., base;  $\frac{5}{8}$  in. and 11-16 in. take an advance of 15c., and  $\frac{1}{2}$  in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of \$2 to \$3 a ton to the small trade.

**Merchant Pipe.**—On January 1, 1910, a new card of Pittsburgh basing discounts will go into effect; it will be sent out a few days before by the leading pipe makers. The new card is designed to do away with some inequalities in methods of quoting prices. Quite a good business is being done in the export trade in pipe, recent shipments including about 20,000 ft. of 17-in. O. D. drive pipe, and about 21,000 ft. of 14-in. O. D. drive pipe. Recent foreign inquiries in the market include 65,000 ft. of 6-in. and 20 miles of 8-in. line pipe, while a reported inquiry is for 140 miles of 6 to 8 in. for shipment to Persia. The Kansas Natural Gas Company has recently bought 12 to 15 miles of 3 to 6 in. line pipe. There is a seasonable dullness in the new demand, but the mills are pretty well filled up for some time ahead, and it is believed that shortly after the first of the year the demand will improve. Discounts on merchant pipe still in effect, but which will be succeeded by the new card of discounts on January 1, are printed elsewhere in this issue.

**Boiler Tubes.**—Railroads are placing some fairly large orders for locomotive tubes, and considerable of this business is pending which will likely be closed after the first of the year. We are advised that the new demand for merchant tubes is only fairly active, showing a falling off as compared with a month or two ago, but which is always the case at this season. Discounts on tubes, printed elsewhere in this issue, are reported as being maintained.

**Wire Products.**—We are advised that the recent advance of 5c. per keg in wire nails, or from \$1.80 to \$1.85 f.o.b. mill Pittsburgh, is being absolutely maintained. The new demand is quiet, but buyers are specifying fairly liberally on contracts placed some time ago on the \$1.70 and \$1.80 basis. The demand for plain and barb wire is also quiet, as it always is at this season. We also note that the demand for cut nails is only fair, dealers probably holding up orders until after the first of the year. We quote wire nails at \$1.85 in carload and larger lots; painted barb wire, \$1.85; galvanized, \$2.15; annealed fence wire, \$1.65; galvanized, \$1.95, and cut nails, \$1.80 to \$1.85, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

**Iron and Steel Scrap.**—The leading feature of the scrap market is heavy steel scrap, which is in good demand and on which prices are firm. There is not much doing in the other grades, and probably will not be until after the first of the year. The mills that use scrap are more concerned now in getting ready for inventory and closing up the year's business than they are in making contracts for material. It is expected that the demand for scrap will be better after the first of the year, but the situation is likely to remain quiet for the remainder of this month. We quote heavy steel scrap for delivery at leading consuming points, such as Monessen, Steubenville, Sharon, Follansbee, Brackenridge and Pittsburgh, at \$18.25 to \$18.50, delivered. No. 1 cast scrap continues weak and is held at about \$16.50, and No. 2 at about \$15.50. On other grades of scrap dealers quote as follows: Low phosphorus melting stock, \$21 to \$21.25; bundled sheet scrap, \$16.25 to \$16.50; rerolling rails, \$18.50 to \$18.75, for delivery at Cumberland, Md., Cambridge or Newark, Ohio; railroad malleable, \$16 to \$16.25; No. 1 busheling, \$15.50; No. 2, \$12.50; grate bars, \$14 to \$14.25; locomotive axles, \$28 to \$28.25; iron axles, \$27.25 to \$27.50; steel axles, \$21.50 to \$21.75; No. 1 railroad wrought scrap, \$19 to \$19.50; old car wheels, \$18 to \$18.25; cast iron borings, \$10.50 to \$11.75; machine shop turnings, \$13; sheet bar crop ends, \$18.75 to \$19. All the above prices are per gross ton, f.o.b. Pittsburgh.

**Coke.**—We are not advised of any important contracts for furnace coke made since our last report, the new demand



for both furnace and foundry having quieted down to some extent. The output of coke in the Upper and Lower Connellsville regions is running very close to 400,000 tons per week. Makers of Connellsville and other standard grades of furnace coke are holding for \$2.75 to \$2.80 per net ton, at oven. We quote best makes of 72-hour foundry coke for first half of the year delivery at \$3.25 to \$3.50 per net ton, at oven.

## St. Louis.

ST. LOUIS, December 20, 1909.

While the leading handlers of pig iron report business still ruling quiet, so far as booking new orders is concerned, they all report that foundries and steel rolling mills, both in St. Louis and East St. Louis and also in Kansas City, St. Joseph and other outside points in St. Louis territory, are very busy, and in some cases not able to take on more contracts at present. Local bankers are reported to be puzzled as to the cause of St. Louis clearings on a single day last week to jump \$2,000,000 above the normal, and thus constituted the third largest day's clearings, the amount being \$17,954,991. The United Railways Company's net income for the past 11 months show an increase of 28 per cent. over the corresponding period of 1908. St. Louis continues far in the lead in manufactures over other Missouri cities, the total for 1908 being greater than that of 17 other cities combined. The zinc-lead output for 1909 will aggregate close to \$14,642,722 (more than \$1,000,000 greater than any year except 1907). This estimate is based on a moderate production for the remainder of this month.

**Coke.**—Inquiry of the leading sales agencies developed nothing new of importance beyond the fact that of unanimity in making it a dull and featureless market, and, in consequence, a weak feeling, though this is confined to spot coke, for which such inquiry as exists is directed, and that only for small lots. It is believed, however, that with the turn of the year the market will be more active and inquiries begin to come in for year's shipment. Owing to the fact that the ideas of Connellsville producers are higher than is the case in some other districts, some business is being diverted from Pennsylvania coke. We quote conditions practically unchanged and previous quotations named, except it is likely there is some shading of price for prompt shipment. For 72-hour Connellsville foundry \$3.25 is the price, nominally, for shipment prior to New Year's, and \$3.50 for first half of 1910 per net ton, f.o.b. oven.

**Pig Iron.**—Except from small buyers or from larger concerns that happen to require some iron faster than it is being furnished on specifications and are thus compelled to go outside of the source of usual supply, or where contracts have already been placed, there is but little to report in the way of current business. We hear of an inquiry for 150 tons of gray forge, and of a sale of 500 tons of Northern car wheel iron for prompt shipment at the full market price. Leading brokers state that buyers find themselves well taken care of with iron which they purchased late in the spring, consequently feel little interest in prices for the first quarter. The inquiry now centers in iron for shipment over the second and third quarters, with buyers counting on being able to purchase for these deliveries at prices now current. The most encouraging feature of the situation is the urgency manifested by buyers to get prompt shipment on contract iron. The fact that in some cases furnaces are behind contract time is good evidence that these furnacemen would not be likely to entertain offers below the market to secure new business. On the other hand, it is reported that some Southern furnaces show a disposition to accept orders below the prices regarded as the market, and thus meet offerings of merchant iron. Prices, therefore, vary somewhat, and appear to be governed by the order books—that is to say, such furnacemen as have nearly cleared up their sales will book a limited amount of business for \$2. foundry, on the basis of \$14.50, f.o.b. Birmingham, for shipment over the first half of 1910. Other brokers state they have no authority to sell at less than \$14.50 for the first quarter and \$15 for the second quarter. As it is not believed that much iron for the second quarter has been booked, it is expected that ere long an active market will be in evidence.

**Lead, Spelter, Etc.**—Lead is higher and strong at 4.50c., with a large demand. Spelter is easier at 6.12½c., East St. Louis; demand fair. Zinc ore is more active at \$50 per ton, Joplin, base. Tin is again higher at 50c. per 100 lb. advanced; antimony is unchanged; copper has advanced ¼c. per lb. The demand for finished metals for the past week has been good.

**Old Material.**—Notwithstanding there is no improvement in the demand, and, for that matter, none expected in the near future, dealers are willing to raise their bids to holders of scrap iron and steel in case of several items in the list, principally steel scrap. This action is predicated on an active demand being witnessed from consumers when their plants are operating in full swing the coming year. At present the leading houses are very busy rounding up

shipments due their customers. There were no railroad lists reported during the past week. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$16.50 to \$17.00
Old steel rails.....	15.50 to 16.00
Old steel rails, rerolling.....	14.50 to 15.00
Old steel rails, less than 3 ft.....	14.50 to 15.00
Relaying rails, standard sections, subject to inspection.....	25.00 to 25.50
Old car wheels.....	17.50 to 18.00
Heavy melting steel scrap.....	14.50 to 15.00
Frogs, switches and guards, cut apart.....	14.50 to 15.00

The following quotations are per net ton:

Iron fish plates.....	\$14.00 to \$14.50
Iron car axles.....	20.50 to 21.00
Steel car axles.....	19.50 to 20.00
No. 1 railroad wrought.....	15.00 to 15.50
No. 2 railroad wrought.....	14.00 to 14.50
Railway springs.....	13.00 to 13.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	10.50 to 11.00
Mixed borings.....	8.00 to 8.50
No. 1 busheling.....	12.00 to 12.50
No. 1 boilers, cut to sheets and rings.....	11.00 to 11.50
No. 1 cast scrap.....	13.50 to 14.00
Stove plate and light cast scrap.....	10.00 to 10.50
Railroad malleable.....	12.50 to 13.00
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	11.00 to 11.50
Railroad sheet and tank scrap.....	9.50 to 10.00
Railroad grate bars.....	10.50 to 11.00
Machine shop turnings.....	10.50 to 11.00

The Illinois Steel Bridge Company, Jacksonville, Ill., certify to an increase in capital stock from \$100,000 to \$200,000.

The Bradley Stencil Company has bought vacant property on the south side of Forest Park Boulevard and will erect a new building to be devoted to its manufacturing business. It will cost \$30,000, and is to be of steel and concrete construction. The business of the company is rapidly increasing.

The Pauly Jail Company has received the contract for supplying all the steel for the new penitentiary at McAlester, Okla. The contract aggregates \$250,000.

## Cincinnati.

CINCINNATI, OHIO, December 22, 1909.—(By Telegraph.)

In the iron markets there are certain features to-day that indicate a healthy tone, notwithstanding the lack of inquiry due to the pre-holiday lassitude in general manufacturing lines. Conspicuous in this respect is the amount of unexpected business developing for which no general inquiry was sent out. Another is seen in the tendency of some large consumers to specify for immediate delivery iron due during the early months of next year. In finished lines there is no lessening of activities, but rather an increase in interest. Machine tool manufacturers, particularly of the heavier types of tools, are steadily booking orders and ordering castings in numbers instead of singly as has been the custom.

**Pig Iron.**—An encouraging feature of the market is the tendency to increase specifications for early shipment. There is also some spot buying. One of the largest local agencies reports more business booked to date this month than in the entire month of November. The leading pipe interest has been active in this market for low grades for delivery to its Anniston and Bessemer plants. Through some of these late purchases a new standard has been established for gray forge and No. 4 foundry, and \$13.50, Birmingham, is believed to be the minimum price available for the former, with \$13.75 asked, 30 to 60 days' delivery. Standard Southern brands may now be obtained on the basis of \$14 for prompt and first quarter delivery, and it is believed that a firm offer would secure the entire first half at that price. The furnace asking price for No. 2 for second quarter is \$14.50, Birmingham, and Nos. 3 and 4 foundry have practically the same market value to-day. The central Ohio manufacturer who was in the market for about 1000 tons of malleable for first half has deferred buying until the 28th. The Michigan manufacturer who wanted about the same amount of malleable is understood to be still seeking. A large elevator manufacturer is said to be buying. There have been some good sales of foundry in Cleveland territory; one agency here booked to-day 3500 tons of foundry and special irons for first half delivery in northern Ohio territory. A Louisville car wheel manufacturing concern has bought about 1500 tons of charcoal iron for first half, understood to be mostly Southern, and on the basis of \$22, at furnace; also a little Northern malleable at around \$17, Ironton. One lot of 400 tons of Southern No. 2 foundry was sold to-day at \$14.25, Birmingham, for shipment in March, April and May. There is some demand for ferromanganese at about \$45.50, Baltimore, and some sales to south central Ohio steel makers. To verify the report that one of the largest independent producers in Alabama had entered the market at \$14 for No. 2, first quarter, communication by long distance telephone developed a denial; the statement was made that \$14.50 represented the minimum furnace price. All selling agents report a remarkable scarcity of requests to hold up shipments, and one agency to-day had a wire offer



of a large tonnage at \$14.50 for last half of 1910 and first half of 1911. For prompt shipment and first quarter, based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$17.75 to \$18.25
Southern coke, No. 2 foundry.....	17.25 to 17.75
Southern coke, No. 3 foundry.....	16.75 to 17.25
Southern coke, No. 4 foundry.....	16.50 to 16.75
Southern coke, No. 1 soft.....	17.75 to 18.25
Southern coke, No. 2 soft.....	17.25 to 17.75
Southern gray forge.....	16.75
Southern mottled.....	16.50
Ohio silvery, 8 per cent. silicon.....	20.20
Lake Superior coke, No. 1.....	18.70
Lake Superior coke, No. 2.....	18.20
Lake Superior coke, No. 3.....	17.70
Standard Southern car wheel.....	24.75 to 25.25
Lake Superior car wheel.....	21.75 to 22.25

(By Mail.)

**Coke.**—Shipments on specifications for foundry coke, which are liberal, are beginning to show the retarding effects of adverse weather. The shortage of cars is marked, especially in the Connellsville field, and this is stiffening the price of spot coke. Shippers are commanding on immediate shipments of Connellsville furnace grades—that is, within the next two or three weeks—\$2.75 to \$2.85 per net ton, at oven, and on contract the range is \$2.80 to \$3. Wise County grades, the standard brands, are bringing \$2 to \$2.10 for furnace, immediate delivery. There is practically no contracting, and nothing upon which to base a quotation for forward business. Wise County foundry is obtainable, either spot or contract, at \$3 to \$3.25. Pocahontas spot foundry brands are selling at \$2.75 to \$3; the 48-hour grades at about \$2.65.

**Shapes, Plates and Sheets.**—Consumers are specifying freely on structural material and, while there are no new projects in sight in this immediate neighborhood, several important jobs are noted in Indianapolis territory. The largest of these is the St. Vincent Hospital, for which about 2000 tons will be needed. There are several small bridge jobs, principally highway, in Indiana and a few in Ohio, that will come out early in the year. Fabricators are still busy figuring on the American Rolling Mill Company's buildings at Middletown. The close approach of the holidays is affecting new business with the jobbers somewhat. They are still getting 2c. on material out of yards. Sheets continue active and the price is unchanged. Material for electrical work is in greatest demand, and mills producing specialties in this line are engaged to the limit of their capacity. The quotations on sheets are in line with the Pittsburgh basing prices, to which 15c. is added for freights.

**Steel and Iron Bars.**—Representatives of mills are not taking contracts, but are exceedingly busy attending to specifications against existing contracts, which are unprecedentedly heavy. Such mills as show a disposition to give immediate or reasonably prompt delivery have no trouble in commanding premiums governed by the circumstances. While there may be some business going at less, open quotations on steel bars are firm at 1.60c., Pittsburgh, and deliveries are not promised earlier than from three to four months. Iron bar mills are all busy and the price is 1.55c. to 1.60c., Cincinnati; dealers' prices from stock, 1.75c.

**Old Material.**—The market continues weak, although dealers having manufacturing connections are moving stocks on yards quite freely. Relayers are strong, inquiries mainly coming from the South and Southwest. In order to stimulate possible buying some dealers are willing to take \$14.75 to \$15 for heavy melting steel, a concession of 25c. to 50c. per ton. Mills in this territory are all carrying heavy stocks, but at the present rapid rate of consumption it is figured that they will have to come into the market within the next few weeks. Cast scrap is a little weaker. As nearly as they can be gauged under the circumstances, dealers' prices to the trade are about as follows, f.o.b. Cincinnati:

No. 1 R. R. wrought, net ton.....	\$14.50 to \$15.00
Cast borings, net ton.....	8.00 to 8.50
Heavy melting steel scrap, gross ton...	14.75 to 15.00
Steel turnings, net ton.....	9.50 to 10.00
No. 1 cast scrap, net ton.....	13.00 to 13.50
Burnt scrap, net ton.....	10.00 to 10.50
Old iron axles, net ton.....	18.50 to 19.00
Old iron rails, gross ton.....	18.00 to 18.50
Old steel rails, short, gross ton.....	15.00 to 15.50
Old steel rails, long, gross ton.....	16.00 to 16.50
Relaying rails, 56 lb. and up, gross ton...	22.50 to 23.00
Old car wheels, gross ton.....	15.50 to 16.00
Low phosphorus scrap, gross ton.....	17.50 to 18.00

What is said to have been the longest railroad train ever drawn by a single engine left Roanoke December 18 for Norfolk over the Virginian Railway. The train consisted of 120 steel cars, each 44 ft. long and each loaded with 50 tons of coal. A Mallet compound engine, a tender and caboose made up the rest of the train. The train from cowcatcher to caboose was 6 ft. more than a mile long, and the coal was valued at \$18,000.

## Philadelphia.

PHILADELPHIA, PA., December 21, 1909.

The usual pre-holiday conditions are noted in the local iron and steel markets. While a fair volume of business continues in some lines, in others the demand has dropped off. The movement in pig iron has been light, purchases in some instances being deferred until after the turn of the year, while others wait further developments, as the market, particularly in foundry grades, has a weaker appearance. No open cutting has been reported, but sellers are not holding the recent high range of quotations. A fair volume of business comes out in plates and shapes. Billets continue active, at unchanged prices. The old material market has had a setback, in that the associated steel mills, after loading up, have reduced their offered price for No. 1 heavy melting steel to \$17, delivered, although some dealers pay higher prices for material to apply on old contracts. Coke has a weaker appearance. Business in practically all lines is expected to diminish gradually until after the turn of the year, when buying is expected to return to more normal conditions.

**Pig Iron.**—Sales have been generally small, although deliveries are being freely taken by practically all classes of consumers. Foundry iron prices continue to show weakness, and a number of leading producers, who have heretofore been holding at \$19.25, delivered, for No. 2 X foundry, have met the general inside quotation of \$19, placing the market for standard brands flatly at the latter figure. No open concessions have been made from that basis, although belief is expressed that, should a desirable tonnage come out, slightly better figures might, in some instances, be obtained. Sellers, however, are not forcing business in any way, furnaces, as a rule, being in a comparatively strong position and for the greater part well sold ahead. Buyers, however, hold off, awaiting further developments, but in a few cases have been testing the market to some extent. One inquiry for several thousand tons, including high silicon No. 2 and No. 2 plain iron, for early 1910 delivery, is reported. Transactions in the higher grades of foundry irons have been mostly in small lots. Some larger tonnages of off grade iron have been sold to the cast iron pipe foundries, aggregating probably 2500 tons, at prices which are considered quite low. Virginia foundry irons have been in light demand, sales of small lots for delivery in this territory being reported at unchanged prices. Practically no business has been done in Southern iron, although sellers have iron to offer at \$14, Birmingham, for No. 2 foundry. Continued dullness is noted in the demand for forge iron; while some of the larger mills have been considering purchases, no business has been done and prices are quoted nominally at \$17.75 to \$18.25, delivered in this territory. Basic iron remains inactive. One buyer is in the market, but refuses to pay the present price, which is firmly held at \$18.75, delivered, for the first quarter or half. Iron is to be had at that basis, but the majority of consumers show no interest in the market. Considerable inquiry for low phosphorus iron is noted. The bulk of the demand comes from consumers outside the territory, although one melter in this district has had inquiries out for several thousand tons. No sales of importance, however, have been reported. Prices are held pretty firmly at \$22.75 to \$23.25, delivered, in this district. No further movement in foreign iron has developed. Several cargoes sold some time ago are due to arrive in the near future, but no fresh business in foundry grades has been done. The general range of quotations for standard brands of pig iron shows little change, although somewhat narrower in certain grades, the following quotations about representing the market for deliveries in this territory during the early portion of next year:

Eastern Pennsylvania, No. 2 X foundry.....	\$19.00
Eastern Pennsylvania, No. 2 plain.....	\$18.50 to 18.75
Virginia, No. 2 X foundry.....	19.00 to 19.25
Virginia, No. 2 plain.....	18.50 to 18.75
Gray forge.....	17.75 to 18.25
Basic.....	18.75
Low phosphorus.....	22.75 to 23.25

**Ferromanganese.**—One sale for early next year's delivery is reported, but consumers as a rule have their requirements pretty well covered. Quotations are nominal at \$45 to \$45.50, Baltimore, for deliveries in the first half of next year.

**Billets.**—A good demand is reported, although inquiries from the West are not so numerous. Eastern producers continue to take a satisfactory volume of business, largely for first quarter delivery, at unchanged prices. Some comparatively large orders have been booked; one lot of 2500 tons of ordinary rolling steel, delivery beginning at once and running through the early part of next year, was sold at \$30, Eastern mill. Prices are firm, ordinary rolling billets for first quarter shipment being quoted at \$30.60, delivered, in this vicinity, with some special grades commanding even higher figures. Forging steel has been in good demand, and prices range from \$32 to \$34, Eastern mill, dependent on analysis. Prompt billets are scarce and still command a premium.

**Plates.**—Specifications are heavy and a fair volume of

fresh business continues to come out. Makers maintain their policy of refusing to contract, and only a few will extend delivery dates beyond the first quarter. Mills are fully engaged, and deliveries on some classes of material are delayed. Quotations are firmly maintained, prices for ordinary plate for early delivery in this territory ranging from 1.75c. to 1.80c., according to specifications.

**Structural Material.**—The most important order placed in this territory was for some 3000 to 4000 tons for an addition to the Curtis Publishing Company Building, which went to the American Bridge Company at a per pound price. No other large contracts were closed, although several fair sized propositions are pending. Miscellaneous business continues of fair proportions and mills are fully engaged. Prices are strong at 1.75c. to 1.80c. for plain shapes, delivered in this territory.

**Sheets.**—A satisfactory business is being done and inquiries continue in good volume. Mills are well supplied with orders and the usual shutdown of the mills during the holidays will be as brief as possible, so as not to delay deliveries on orders in hand. Prices are strong and prompt deliveries still command a premium. For delivery in the early months of 1910 the following range of prices is quoted: Nos. 18 to 20, 2.70c.; Nos. 22 to 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.

**Bars.**—The various mills in this vicinity are nearly all in a comparatively strong position. A good volume of business is on their books and prices are well maintained, with little disposition to make concessions. In many cases the usual year end shutdown will be made as short as possible. The market on the whole is firm, although the usual quietness in new business at this season is noted. Prices for refined iron bars for early shipment are firmly maintained at 1.65c. to 1.75c., delivered, by the leading producers, steel bars being quoted at 1.65c. to 1.70c., delivered, but ordinary sizes of the latter are not available for early shipment.

**Coke.**—The demand has not been urgent, and a further decline in prices is observed. Standard furnace coke still commands \$2.75 per net ton, at oven, but less well-known brands can be had down to \$2.50. The better grades of foundry coke are quoted at \$3.25 per net ton, at oven, but other makers shade prices about 25c. a ton. The following range of prices is quoted for delivery in this territory, for early 1910 shipment, per net ton:

Connellsville furnace coke.....	\$4.75 to \$5.00
Foundry coke.....	5.25 to 5.50
Mountain furnace coke.....	4.35 to 4.60
Foundry coke.....	4.85 to 5.10

**Old Material.**—The market received a distinct shock last week when the associated steel mills, after loading up with a sufficient quantity of scrap at the recent level to keep them going for some time, reduced their offering price for No. 1 heavy melting steel to \$17, delivered. That importations recently have been so heavy that the supply of steel scrap has become greater than the demand is one of the reasons given for the reduced price, as well as the fact that all the associated mills, with possibly one exception, have as much material on hand as they can conveniently carry and can hardly be said to be in the market even at the reduced price. Under existing conditions a quotation for No. 1 heavy melting steel, which will cover the various phases of the present market, is hard to arrive at. Merchants acting with the associated mills state their offering price to be \$16.60, delivered, while those outside the combination claim that they must pay over \$17 to get material. Outside consumers are understood to be willing to pay \$17.50 and \$17.75, delivered, and one sale at a higher figure is reported. Until the market adjusts itself more clearly, therefore, the price of heavy melting steel is quoted nominally at \$17 to \$17.75, delivered. Rolling mills are not making further purchases and the market has a distinct waiting attitude. In many grades not sufficient business has been transacted to make a market, and prices for delivery in buyers' yards, eastern Pennsylvania and nearby points, are nominally quoted as follows:

No. 1 steel scrap and crops.....	\$17.00 to \$17.75
Old steel rails, rerolling.....	18.00 to 18.50
Low phosphorus.....	23.00 to 23.50
Old steel axles.....	24.00 to 25.00
Old iron axles.....	30.00 to 31.00
Old iron rails.....	20.50 to 21.50
Old car wheels.....	17.50 to 18.00
Choice No. 1 R. R. wrought.....	19.50 to 20.00
Machinery cast.....	17.50 to 18.00
Railroad malleable.....	16.50 to 17.00
Wrought iron pipe.....	16.50 to 17.00
No. 2 forge fire scrap.....	16.00 to 16.50
No. 2 light iron.....	10.75 to 11.25
Wrought turnings.....	14.25 to 14.75
Stove plate.....	13.25 to 13.75
Cast borings.....	12.00 to 12.50
Grate bars.....	14.50 to 15.00

The No. 2 furnace of the Republic Iron & Steel Company, at Thomas, Ala., made the record output of 328 tons on December 20—an unusual performance for a Southern furnace 18½ x 90 ft.

## The German Iron Market.

BERLIN, December 9, 1909.

The quieter tone of the market has continued, but there is no lack of evidence that the situation continues gradually to grow better. Notwithstanding the weakening of pig iron prices in England, which might have been expected to influence the tendency in Germany, no such effect has as yet been observed. On the contrary, pig iron continues to rise steadily, if rather slowly. At last Friday's trading in iron and steel products on the Düsseldorf Exchange, which represents the open market movement, higher prices were again recorded. The following figures were quoted, compared with the last previous quotation: Thomas iron, 52 to 54 marks (against 49 to 52 marks); Luxemburg puddling, 47 to 49 (46 to 48); Luxemburg foundry, 52 to 53 (51 to 52); German foundry No. 1, 60 to 62 (59 to 61); No. 3, 59 to 61 (58 to 60); band iron, 127.50 to 132.50 (125 to 130); thin sheets, 127.50 to 131 (125 to 130). On the other hand, the gas and boiler tube syndicate has just voted an increase of 3 to 5 per cent. in its rebates, which amounts to a price reduction. It is also reported that general dealers in some few cases have been selling goods at slightly easier prices, especially where they had laid in too large stocks on a speculative basis. Iron furnaces and steel manufacturers, however, are mostly adhering strictly to their price-lists. There is one exception to this in the case of pig iron. It is creditably reported that several contracts for 1910 delivery have recently been placed at lower prices than have latterly prevailed. This fact was reported yesterday by the *Cologne Gazette* to show that the recent agreement, referred to in this correspondence, to take no contracts prior to January 15 for the present, is not being lived up to.

The production of pig iron is steadily increasing and is now almost at the highest level ever reached. The November production, as published yesterday, amounted to 1,119,051 metric tons, comparing with only 930,738 tons in November, 1908. There have been only two months in the history of the trade—namely, July and October, 1907, in which slightly higher figures were registered; but the daily rate of production is now higher than ever, and a new record may be expected for this month. From the Siegerland District it is reported that several furnaces that had long been idle have recently been blown in. That region was hardest hit during the recent period of depression; of 32 furnaces there only 11 were in operation continuously. The demand for pig in that district is increasing, and the ore producers have been able further to increase their output to 75 per cent. of their capacity. It is expected that by next spring they will be running full.

The scrap market continues firm. All that comes on the market finds ready sale. It is now doubted that American buyers made the large purchases of scrap in Germany reported some two or three months ago. In order to disprove those reports the newspapers are printing the export statistics showing that the exports of scrap in October were somewhat lower than usual; but it is known, as better informed newspapers are pointing out, that those American contracts mostly remain to be filled in coming months. Especially have American buyers contracted for large amounts of the best steel scrap, and that specialty has accordingly grown scarce for home buyers.

The shipments of the Steel Syndicate of semifinished steel, structural shapes, and rails and ties in November amounted to 390,000 metric tons, which is a reduction of about 30,000 tons from the October figures. Nevertheless, according to the market reviews, the business in semimanufactured steel remains good, and the calls for delivery on orders are satisfactory. In view of the advance of prices in the world's markets the syndicate has decided to reduce the export bounty from 15 to 10 marks per ton on goods delivered after March 31. It reports that the foreign demand for heavy rails continues active, and large orders are coming in.

The bar trade has grown quieter, but the mills are well employed on existing orders. New orders from the home market are scarce, as the mills are not selling beyond the first quarter, and the wants of consumers for that period have already been about covered. Dealers in bars who had overloaded themselves are selling below manufacturers' present prices. The foreign demand for bars is lively; bars of soft steel for export are sold at 102.50 to 105 marks on board ship. In hand iron the mills are sold out for the first quarter of 1910. The wire rod mills are so overrun with work that orders cannot be all filled on time. Wire mills and wire nail makers are busy with orders on hand, and the higher prices recently adopted are willingly paid by buyers. Business in heavy plates has grown more active. The recently organized combination has been able to put up prices to a more satisfactory basis. Many of the mills running on thinner sheets are sold up to their full capacity, but prices, though they have been lifted, are not yet high enough to insure a satisfactory profit.

The situation of the hardware trade has further improved. The amount of work on hand with most of the shops is sufficient for immediate requirements. In some lines prices are again higher. Machinery shops report that



orders have been coming in at a better pace recently, but prices are still unsatisfactory; even yet many orders have to be taken at losing prices or lost altogether. Many of the great iron companies are only disposed to order machinery when the shops agree to take part payment in iron and steel supplies. The machinery shops in the Siegerland region are much better employed than hitherto.

The Krupp Company has just announced a dividend of 8 per cent. for the business year ended June 30, being the same as for last year. The gross earnings amounted to 27,375,000 marks, against 20,372,000 last year. Fourteen of the leading iron companies of the country, not including Krupp, had gross profits of 91,982,000 marks for the past year, which was about 8,700,000 marks less than for the previous year.

## Birmingham.

BIRMINGHAM, ALA., December 21, 1909.

**Pig Iron.**—There was probably sold during the past week some 20,000 tons of pig iron. Considerable of this was for delivery over the first half of 1910, some over the first quarter and some deliverable during December and promptly. There is really no base price to-day of Southern coke iron. Some of the furnace companies are disposed to sell at \$14.50 for prompt or first quarter business; others prefer not to quote at all, and others are holding firm at \$15 for first half. Considerable warrant iron has been sold on the basis of \$14, at the furnace, for delivery during December of this year. This iron is fast moving from the yards, and it is thought that by the first of the year no telling tonnage will be available to demoralize in any way the pig iron situation. With the approach of the holidays buyers are as a rule only taking on what additional iron they can get at a concession. The shrewd buyers have realized their opportunity and taken advantage of it. The price of gray forge iron is firmly maintained, and there is no tonnage worth speaking of available for anything like decent delivery. Conditions have materially changed in Southern iron practice, and that fact is responsible for the great decrease in low grade production. Then again, the Southern melt has been on the increase for the past two years (barring the extreme panicky period), and it is very doubtful whether Southern iron will ever be shipped to the West at anything like the proportions of 1907. The charcoal iron market is firm at \$22 to \$22.50, at furnace.

**Cast Iron Pipe.**—Weather conditions in the middle and extreme West have been adverse to the heavy iron pipe industry and similar conditions now prevail in the South. While there has been no decline in the price of pipe, the demand has materially slackened. It is a good time, however, for the different municipalities to figure on their prospective needs; and to that end bond issues are coming up from time to time for this purpose. Manufacturers have sufficient orders on their books to carry them well into the next year, and practically over the worst weather conditions. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$26; 8 to 12 in., \$25; over 12 in., average, \$24; with \$1 per ton extra for gas pipe.

**Old Material.**—The weather has been so unfavorable for outside work that little scrap has been gathered. In fact, dealers are only picking up such scrap as they are able to find at a bargain. Stocks on yards are comparatively large. The largest dealers here are inclined to hold firm, being of the opinion that after the holidays a good buying movement will come. Following are asking prices, per gross ton, f.o.b. cars Birmingham:

Old iron axes.....	\$20.00 to \$20.50
Old iron rails.....	16.00 to 16.50
Old steel axes.....	19.00 to 19.50
No. 1 railroad wrought.....	14.50 to 15.00
No. 2 railroad wrought.....	12.00 to 12.50
No. 1 country wrought.....	11.50 to 12.00
No. 2 country wrought.....	11.50 to 12.00
No. 1 machinery.....	13.00 to 13.50
No. 1 steel.....	12.25 to 12.75
Tram car wheels.....	12.50 to 13.00
Standard car wheels.....	14.50 to 15.00
Light cast and stove plate.....	10.50 to 11.00
Cast borings.....	6.50 to 7.00

## Buffalo.

BUFFALO, N. Y., December 21, 1909.

**Pig Iron.**—The market has been exceedingly quiet with diminished placing of new business incident to the close approach of the holiday season. Iron on contracts continues to go out from furnaces in notably large volume, the shipments called for being so heavy that furnaces in some instances are unable to keep pace with specifications, owing partially to the coincident fact of being hampered by a lack of labor for loading. All furnaces in this district are comfortably supplied with orders for several months ahead, a number of them having all the business they can readily take care of during that time. Prices remain stationary.

We quote as follows per gross ton f.o.b. Buffalo for first quarter and half delivery:

No. 1 X foundry.....	\$17.25 to \$18.00
No. 2 X foundry.....	17.00 to 17.50
No. 2 plain.....	16.25 to 17.25
No. 2 foundry.....	16.50 to 16.75
Gray forge.....	16.25 to 16.50
Malleable.....	17.50 to 18.00
Bessemer.....	19.25 to 19.75
Basic.....	18.25 to 18.75
Charcoal.....	20.50 to 21.00

**Finished Iron and Steel.**—There is some curtailment of business, attributable to the usual midwinter holiday ease-ment of trade, although there appears to be no cessation of specification against contracts, especially for bar material and plain shapes. The demand for black and galvanized sheets also keeps up well. Little new business in structural material developed during the week, but a number of new projects are under way which will soon come up for figures. Revised plans have been prepared for the new plant of the Beaver Mfg. Company, which will call for about 400 tons of concrete reinforcing bars, instead of 150 tons, as in the original estimate. The Buffalo Structural Steel Company was low bidder for the fabrication and erection of the 500 tons of steel for the 13-story Statler Hotel Annex, Buffalo, and also for the 150 tons for the Buffalo Glass Company's new building.

**Old Material.**—The market is extremely dull and lifeless, with prices a shade weaker, and it is expected that inactivity and pronounced quietness will characterize the situation until after the first of the year and the inventory period is over. Wrought scrap is 25c. to 50c. per ton lower than last week and prices for heavy melting steel and turnings and borings have been shaded somewhat on such sales as have been made to save unloading in dealers' yards. We quote as follows, per gross ton, f.o.b. Buffalo, the prices given being largely nominal:

Heavy melting steel.....	\$16.50 to \$17.00
Low phosphorus steel.....	20.00 to 21.00
No. 1 railroad wrought.....	17.75 to 18.00
No. 1 railroad and machinery cast scrap.....	16.50 to 17.00
Old steel axes.....	20.50 to 21.00
Old iron axes.....	26.00 to 26.50
Old car wheels.....	17.50 to 18.00
Railroad malleable.....	17.00 to 17.50
Boiler plate.....	14.50 to 15.00
Locomotive grate bars.....	13.00 to 13.50
Pipe.....	14.00 to 14.50
Wrought iron and soft steel turnings.....	11.00 to 11.50
Clean cast iron borings.....	9.00 to 9.50
No. 1 bushing scrap.....	14.00 to 14.50

**Railroad Equipment Orders.**—Among car orders recently placed are 1000 gondola cars for the Toledo & Ohio Central, taken by the Ralston Steel Car Company, Columbus, Ohio; 100 all-steel gondolas and 100 steel underframe flat cars for the Maine Central; 100 furniture cars for the Erie; 400 Hart cars for the Northern Pacific; 100 cars for the Cornwall & Lebanon; 65 passenger cars for the Reading; 250 passenger and baggage cars for the St. Paul; 1000 steel underframe box cars and 500 steel gondola cars for the Reading, which is reported in the market for 1000 additional cars. The following inquiries are reported: Cincinnati Traction Company, 75; Mather Horse & Stock Car Company, 250 automobile cars; Atlanta & West Point, 25 gondola cars; San Diego & Arizona, 20 flat cars; Lackawanna, 35 passenger cars. Among locomotive orders the following are reported by the *Railroad Age-Gazette*: Ten for the Southern Railway, 7 for the Gilmore & Pittsburgh, 22 for the Elgin, Joliet & Eastern, 4 for the Soo Line, 6 for the Maine Central. The Lackawanna is reported in the market for 48 locomotives, the Nickel Plate for 20 and the Missouri Pacific for 40 to 50.

The *Enterprise*, Virginia, Minn., has published a historical souvenir of the iron ranges of Minnesota. It has much interesting data concerning the discovery and opening up of various iron ore properties. There are half-tone views of some of the principal open pit mines and of the men who led in their development. The importance of the Virginia District is impressed upon the reader not only by descriptions and illustrations of iron mines, but of the business and public structures in this representative mining town of the Mesaba District. A feature of the edition is a map of the Mesaba and Vermilion ranges, with the locations of the various properties and their railroad connections.



## New York.

NEW YORK, December 22, 1909.

**Pig Iron.**—Inquiries for iron for the second half of 1910 are beginning to come up and business for such delivery may not be long delayed. Furnaces as a rule are not seeking such business, but some are willing to entertain a limited amount at 50 cents to 75 cents above their prices for the first half. In view of the well bought condition of the foundry interests in this district and in New England spot business is very small and sellers look for comparative quiet throughout January. The recent purchases at Paterson amounted to about 3500 tons of foundry iron. Low prices were made, some No. 2 iron being sold at \$18.25, delivered. Inquiry has come up for a round lot of foundry iron for delivery at Trenton. We quote the New York market at \$19 to \$19.25 for No. 1, \$18.50 to \$18.75 for No. 2, and \$18.25 to \$18.50 for No. 2 plain.

**Structural Material.**—The demand for plain material continues brisk and, while the mills will take orders for certain shapes and sizes, they are avoiding contracts for the most used kinds of structural material. In the next quarter greater freedom is looked for in the taking of contracts. As is usual at this time of the year there is a slight falling off in new orders for fabricated material. While no especially large inquiries are up, a number of fair sized lots have been taken and others are pending. For the Automobile Club of America Building about 2000 tons of shapes will be required. The Hedden Construction Company has the general contract. The McClintic-Marshall Construction Company has been awarded the contract for a double track bridge (1800 tons) to span the yards of the Long Island Railroad in Long Island City, by the Pennsylvania Tunnel & Terminal Company. The same company will supply 1600 tons for an extension of the plant of the Standard Steel Company at Burnham, Pa., and will also construct a building for the Mount Vernon Car Mfg. Company at Mount Vernon, Ill. The Wilmarth Building Company is the general contractor for the extension of the Metropolitan Museum in New York City, which will require from 800 to 1000 tons. The Statler Hotel at Buffalo will take about 700 tons and has gone to a local concern. The American Bridge Company has secured a bridge for the Oliver Iron Mining Company at Hibbing, Mich., which will require 500 tons, and the Chicago Telephone Exchange, 1100 tons. At present this company has work scheduled for the next five or six months. Bethlehem shapes will be used in the following: A hotel at Springfield, Mass., Levering & Garrigues, contractors, 700 tons; Baldwin Locomotive factory at Philadelphia, Belmont Iron Works, contractor, 400 tons; Denver City Tramway Office Building, Minneapolis Steel & Machinery Company, contractor, 2000 tons; the Bronx Theatre, Hudson Structural Steel Company, contractor, 400 tons; an Anheuser-Busch brewery in St. Louis, 800 tons; Carnegie Realty apartments, New York, Passaic Steel Company, contractor, 1000 tons; City National Bank, Paducah, Ky., L. Schreiber & Sons, contractors, 700 tons, and the May office building, Cleveland, Ohio, J. H. Brooks & Co., contractors, 1000 tons. Bids were closed last Saturday for 3500 tons for a warehouse for the Wakefield Company and Haywood Brothers. The award has not yet been made. Lee & Hewitt are the engineers and architects. Prices on plain material are unchanged, 1.76c. New York.

**Plates.**—In the East particularly the plate market is very quiet and prices are firm at 1.76c, tidewater. In this section there is little demand for plates for other than shipbuilding, and just now very little of that. It will probably be the middle of January before anything resembling activity will be experienced in this trade. Deliveries can now be had in from a week to 10 days, and even better when the quantity is sufficiently attractive.

**Bars.**—No change is to be reported in the bar trade. Steel bars continue to be months behind in delivery and the bar iron producers are reaping the benefit. We still quote steel bars at 1.66c, New York; ordinary refined iron bars at 1.70c. to 1.75c., and test bars at 1.75c. to 1.80c., New York, in carload lots.

**Ferroalloys.**—Ferromanganese is quiet and is being sold in this market for \$45.50. There is a fairly good demand for ferrosilicon, and it is quoted at from \$62 to \$62.50.

**Cast Iron Pipe.**—The current demand is light. Of course, this is simply in accordance with the usual year-end experience. Excellent inquiries, however, continue to be received for next year's delivery. Carload lots of 6-in. are quoted at \$25.50 to \$26 per net ton, tidewater.

**Old Material.**—The market is quiet and prices are weak. The action of the eastern Pennsylvania steel mills in heavily reducing their buying price for heavy melting steel scrap and the knowledge that practically all the mills are well supplied with stock of this character have especially depressed this branch of the trade. Dealers are now making low bids on offerings by holders of scrap of this character. A noteworthy exception to this general attitude was the bidding for the steel scrap to be turned out by the Brooklyn Navy Yard up to June 30, and including 200 tons on hand.

The successful bidder named \$1 per ton above the top of what is considered the present market. A sale of a cargo of scrap from the Panama Canal, consisting of about 1000 tons, has been made at \$13.51 per ton on dock. This appears to be quite a high price, as the cargo consisted of old locomotive frames, car axles with wheels on them, whole boilers and other large pieces which will require much labor to make them merchantable. Heavy rejections are still being made by consumers, causing the resale of much scrap that had been regarded as securely placed. In the present condition of business, quotations are approximately as follows, per gross ton, New York and vicinity:

Rerolling rails.....	\$15.00 to \$15.50
Old girder and T rails for melting.....	14.00 to 14.50
Heavy melting steel scrap.....	14.00 to 14.50
Relaying rails.....	20.50 to 21.00
Standard hammered iron car axles.....	23.00 to 23.50
Old steel car axles.....	19.50 to 20.00
No. 1 railroad wrought.....	16.25 to 16.75
Wrought iron track scrap.....	14.50 to 15.00
No. 1 yard wrought, long.....	14.50 to 15.00
No. 1 yard wrought, short.....	14.00 to 14.50
Light iron.....	9.00 to 9.50
Cast borings.....	9.00 to 9.50
Wrought turnings.....	10.50 to 11.00
Wrought pipe.....	13.25 to 13.75
Old car wheels.....	15.50 to 16.00
No. 1 heavy cast, broken up.....	15.00 to 15.50
Stove plate.....	13.00 to 13.50
Locomotive grate bars.....	12.50 to 13.00
Malleable cast.....	16.50 to 17.00

A. K. Barker, formerly of B. Nicoll & Co., New York, has opened an office in the Singer Building, and will deal in scrap iron and steel. Mr. Barker takes up the old material business of B. Nicoll & Co., who have withdrawn from that branch of the trade with the possible exception of rails and crop ends.

## Metal Market.

NEW YORK, December 22, 1909.

## THE WEEK'S PRICES.

Copper.				Cents per Pound.		Lead.		Spelter.	
Dec.	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
16.....	13.75	13.50	32.95	4.60	4.52½	6.40	6.20	6.40	6.20
17.....	13.75	13.50	32.90	4.60	4.52½	6.40	6.20	6.40	6.20
18.....	13.75	13.50	...	4.60	4.52½	6.30	6.15	6.30	6.15
20.....	13.75	13.50	33.85	4.70	4.65	6.30	6.15	6.30	6.15
21.....	13.75	13.50	33.90	4.70	4.67½	6.30	6.15	6.30	6.15
22.....	13.75	13.50	33.80	4.70	4.67½	6.30	6.15	6.30	6.15

**Copper.**—Copper prices are nominal, as the market is particularly quiet. The United Metals Selling Company is asking 13.75c. for electrolytic, which amounts practically to a withdrawal from the market. It is apparent that the company is looking for a higher market, and the indications are that there will be a restriction in production shortly. It is declared on good authority that the curtailment plans are more mature, and a leading interest that was heretofore unwilling to participate is now reported to be in the movement. While the Calumet & Hecla people were not concerned in any merger proceedings they have curtailed their production 15 per cent. This independent action on their part, it is thought, will hasten the plans for holding down the production of copper, and a decisive move in this direction will probably induce a buying movement. We quote electrolytic at 13.50c. and lake at 13.75c. Casting copper is firm at 13.37½c., and there is a better demand for that grade than for lake or electrolytic. The London market is apparently awaiting developments here, as it is quiet, but prices are firmer than they were last week. In that market to-day spot copper brought £60 5s. and futures £61 7s. 6d. The sales amounted to 300 tons of spot and 800 tons of futures. The market was steady. The exports of copper continue light, and so far but 17,976 tons have been sent abroad. Some people are wondering when shipments will be made on the reported heavy sales of a month ago.

**Pig Tin.**—Pig tin is higher than it has been in two years, it having advanced 90 points within a week. There is a corner in London that is more or less speculative, while here the available tin is in the hands of a few people. A buying movement of any volume would send prices soaring in this market, and as the matter stands not since May, 1907, has pig tin been so costly. At that time it was selling for 44.37½c., and the highest price established in 1908 was 32.42½c. Yesterday moderate lots were sold at 33.90c. The London market took a bulge December 20 and this market responded by going up 90 points. The demand during the week was moderate, although in some quarters good sales were made. It is evident that parties who are obliged to buy tin for immediate use within the next week or so will have to pay high for it. The established price of tin in the New York market to-day was 33.80c. The London market went off 5s. on spot and 10s. on futures this morning, but at that spot tin was £5 5s. higher than it was a week ago to-day. This afternoon spot tin was sold in London for £153 7s. 6d. and futures for £154 2s. 6d., and the market

was easier than it was in the morning. The sales were 150 tons of spot and 650 tons of futures.

**Tin Plates.**—The shortage of tin plate continues and deliveries are very uncertain. There is some complaint over freight delays. The leading interest continues to quote for 100 lb. I C coke plates \$3.84, and higher prices are being asked by others. The demand for tin plates from abroad continues strong, but the price at Swansea is held the same as last week, which is 12s. 6d.

**Lead.**—Never before in the history of the trade has lead advanced so sharply in a December month, and the general conditions are unprecedented. In St. Louis the market is very strong and sales of selected brands have been made at as high prices as have obtained in New York. During the last 12 days lead has advanced 30 points here and something more than that in St. Louis. Following the advance made on the afternoon of December 15 the price was put up again 10 points on December 20. A statement has been made that the American Smelting & Refining Company has made heavy sales of lead and there is some shortage. This is unusual for December, and the reported sales have not been traced. The outside interests are apparently agreeable as regards putting up prices, however, as they have followed the movement of the leading interest closely. In St. Louis where they control the situation they are asking as high as 4.70c., and sales have been made at 4.67½c. Consumers who have been caught short are wary, and are buying the metal only as they need it regardless of rumors to the effect that the price in New York will be advanced to 4.75c. within the near future. We quote the New York market strong at 4.70c. and the St. Louis market at 4.67½c. The London market has not advanced as sharply as the market here, and if the high prices continue it is probable that a good deal of foreign lead will be sold in this market within the next three months, as it would pay to import the ore and smelt it at the existing price.

**Spelter.**—There has been a reaction in spelter and it can now be had for 6.30c., New York. Large offerings of resale lots have brought this about and considerable spelter has been unloaded at prices between 6.30c. and 6.40c. The St. Louis market is weak at 6.15c.

**Antimony.**—The advanced prices of antimony are being maintained and prices for future delivery are being stiffened somewhat. Hallett's is bringing 8.25c. and Cookson's is selling at 8.50c. Outside brands are 8c. Some small lots may be picked up at slightly under these prices.

**Old Metals.**—The market is firm. Following are dealers' selling prices:

	Cents.
Copper, heavy cut and crucible.....	13.00 to 13.25
Copper, heavy and wire.....	12.50 to 12.75
Copper, light and bottoms.....	11.75 to 12.00
Brass, heavy.....	9.25 to 9.50
Brass, light.....	7.75 to 8.00
Heavy machine composition.....	12.25 to 12.50
Clean brass turnings.....	8.75 to 9.00
Composition turnings.....	10.25 to 10.50
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.90 to 3.95
Zinc scrap.....	5.00 to 5.25

## Iron and Industrial Stocks.

NEW YORK, December 22, 1909.

The week has been characterized by decided strength in iron and industrial stocks. This was partly due to the general firmness of railroad stocks and partly to the excellent trade prospects for the coming year. A notably heavy advance was made by International Harvester common, regarding which reports of the declaration of a dividend were in circulation. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	15½-15½	Railway Spr., com.	51½-52
Allis-Chalm., pref..	54½-55½	Republic, com....	46-47
Beth. Steel, com....	33½-34½	Republic, pref....	104½-107½
Beth. Steel, pref..	67½-68½	South. I. & S., com....	23½
Can. com.....	13½-14½	South. I. & S., pref....	51
Can. pref.....	81½-83½	Sloss, com.....	86½-87
Car & Fdry., com....	71½-72½	Sloss, pref.....	118
Car & Fdry., pref..	118½-119½	Pipe, com.....	32½-32½
Steel Foundries....	65-65½	Pipe, pref.....	84-84½
Colorado Fuel.....	50½-52½	U. S. Steel, com....	91-92½
General Electric....	159-161	U. S. Steel, pref..	124½-125½
Gr. N. ore cert....	80½-82	Westinghouse Elec.	80½-83½
Int. Harv., com....	110-116½	Va. L. C. & C.....	72-73
Int. Harv., pref..	124½-128	Am. Ship, com....	78½-79½
Int. Pump, com....	50-50½	Chi. Pne. Tool....	38½-39
Int. Pump, pref..	90	Cambria Steel....	47½-49½
Locomotive, com....	60½-61	Lake Sup. Corp....	27-27½
Locomotive, pref..	113½-114	Warwick.....	10½
Nat. En. & St., com.	28-30	Crucible Steel, com	15½-17½
Nat. En. & St., pref.	99½	Crucible St., pref..	92½-94½
Pressed St., com....	51½-52	Harb.-W. Ref., com.	36
Pressed St., pref..	105½	Harb.-W. Ref., pref.	94-95

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 91½, preferred 125, bonds 105½; Car & Foundry common 71½, preferred 119½; Locomotive common 60½, preferred 114; Steel Foundries 65; Colorado Fuel 50½; Pressed Steel common 52, preferred 105½; Railway Spring common 52; Republic

common 46, preferred 105; Sloss-Sheffield 86½; Cast Iron Pipe common 32½, preferred 84½; Can common 13½, preferred 81½.

## Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, furnish the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, due January, 1926....	88½	89½
Bethlehem Steel purchase money 6s, August, 1998..	116½	117½
Buffalo Iron 5s, October, 1925.....	95	100
Buffalo & Susquehanna Iron 1st 5s, June, 1932....	99½	99½
Buffalo & Susquehanna Iron deb. 5s, January, 1926.	94	97½
Dominion Iron & Steel 5s, July, 1929.....	98	98½
La Belle Iron 1st 6s, December, 1923.....	103½	104½
Lackawanna Steel 1st 5s, April, 1923.....	99½	100
Maryland Steel 1st 5s, February, 1922.....	101	102
Pennsylvania Steel 1st 5s, November, 1917.....	101	103
Pennsylvania & Maryland Steel 6s, September, 1925..	109	110½
Republic Iron & Steel 1st 5s, October, 1934.....	102½	103
Sloss Iron & Steel 1st 6s, February, 1920.....	106	109
Sloss Iron & Steel consol. 4½s, April, 1918.....	95	98
Jones & Laughlin 1st 5s, May, 1939.....	101½	101½

## United States Steel Corporation.

Collateral Trust 5s, Series A, C, E, April, 1951....	114½	115½
Collateral Trust 5s, Series B, D, F, April, 1951....	114½	115½
Sinking Fund 5s, April, 1963.....	104½	105½
Union Steel 1st 5s, December, 1952.....	104½	105½
Clairton Steel 5s, 1908-1913.....	100	100
St. Clair Furnace 1st 5s, 1910-1939.....	100	100
St. Clair Steel 1st 5s, 1908-1926.....	100	100
Illinois Steel deb. 5s, January, 1910.....	100	100
Illinois Steel 5s, April, 1913.....	100	100

All bonds quoted "and interest."

The Crucible Steel Company of America reports its gross profits for the quarter ended November 30, 1909, as follows: September, \$428,858.10; October, \$471,634.09; November, \$510,413.51; total, \$1,410,905.70. Deduct charges and appropriations for the following purposes: Depreciation and repairs, \$305,964.03; contingencies, \$33,148.24; total, \$339,112.27; leaves net profits, \$1,071,793.43. The surplus November 30, 1909, was \$3,863,245.12, against \$2,095,882.75 November 30, 1908, showing \$1,767,362.37 increase. The net profits for the present quarter of \$1,071,793.43, compared with those for the corresponding period of last year of \$402,988.48, show an increase of \$668,804.95 in favor of the present quarter.

**Dividends.**—Manning, Maxwell & Moore, Inc., have declared the regular quarterly dividend of 1½ per cent., payable December 31.

The Standard Coupler Company has declared a dividend of 1 per cent. on the common stock, payable December 24. This is the first disbursement on the common stock since 1907.

The American Shipbuilding Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable January 15.

The American Locomotive Company has declared the regular quarterly dividend of 1¾ per cent., payable January 2.

The Empire Steel & Iron Company has declared the regular semi-annual dividend of 3 per cent.

The Sloss-Sheffield Steel & Iron Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock, payable January 3.

The Garvin Machine Company has declared the regular semi-annual dividend of 3½ per cent. on the preferred stock, payable January 1.

The Westinghouse Air Brake Company has declared a regular quarterly dividend of 2½ per cent., an extra dividend of 2½ per cent. and a special dividend of 1 per cent. Three months ago an extra dividend of 1½ per cent. was declared.

The Riehle Brothers Testing Machine Company, Philadelphia, Pa., December 16, declared an annual dividend of 6 per cent. and an extra dividend of 1 per cent. for the year 1909.

The Patterson Tool & Supply Company, Dayton, Ohio, announces that it has for sale the machines and tool equipment formerly owned by the Dayton Hydraulic Machinery Company. The Patterson Company has recently opened a branch office in room 502 American Central Life Building, Indianapolis, Ind., under A. G. Schonacker, manager.

The advertising department of the Wheeling Corrugating Company is distributing as a souvenir a handsome watch fob. Requests for these fobs should be addressed to the Wheeling Corrugating Company, Department G, Wheeling, W. Va.

The Madeira Iron Mining Company, Duluth, Minn., has been incorporated, with capital stock of \$50,000, and will open an iron mine at Hibbing, Minn., which is to be underground. The company expects to be able to ship the coming season. A. B. Coates is president and Geo. P. Tweed secretary.



### The Condition of the Hardware Trade.

Relative to the condition of the hardware trade *Iron Age-Hardware* of December 18 says:

The most notable event in the realm of hardware during the past week is the advance of \$1 per ton on wire nails and wire. This action by the manufacturers has been anticipated and will therefore be no surprise to the trade. The fact that the advance is 5 cents per keg on nails and 5 cents per 100 lb. on wire indicates the conservatism of the great interests in this important field.

The volume as well as the character of business indicates the near approach of the end of the year. The influence is felt alike of the holiday season and of the annual inventory. The genial atmosphere of Christmas and matter of fact attention to the balancing of the books and ascertaining in black and white the results of the 12 months business thus unite to interfere with the volume of current trade. There is, however, much doing by the larger merchants in placing orders for next season, and with the confidence which prevails that business in 1910 will be of large volume manufacturers find that the blank pages of their order books are gradually filling up without the pressure of solicitation from traveling representatives which is usually resorted to. There is, too, a good volume of current business, in taking care of the orders covering goods which are needed at once for the replenishment of stocks. Many manufacturers indeed are still busy on back orders, especially in the heavy lines. Some makers of shelf hardware and tools and the finer products generally are somewhat, and in some cases considerably, behind their orders.

Difficulty in getting raw material is still occasioning embarrassment to not a few manufacturers. A more serious matter is the complaint which is made here and there by manufacturers that they are having difficulty in getting the standard quality which their work requires, and which it was much easier to get in times when the mills were not so rushed with work. The point made by a well-known manufacturer is certainly well taken, that manufacturers should perfect their organizations in such a manner as will insure to their customers the maintenance of the same quality in busy times as in dull times. It is certainly a hardship for manufacturers to be penalized for placing generous orders by being forced to accept inferior quality. This is a matter to which manufacturers should give careful attention, and especially those who are interested in export trade, where any lapse in quality injures a good and growing reputation sometimes irreparably.

Changes in price in the hardware field are this week comparatively few. There is a growing disposition on the part of manufacturers to keep prices on an even keel and avoid changes unless really necessary. In a good many lines quotations have for several years remained without change, contrasting pleasantly with the goods which have in such period seen many fluctuations.

At the annual meeting of the Colt's Arms Company, the holding corporation of Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., William C. Skinner was elected president, to succeed the late Lewis C. Grover, and F. A. Schirmer, Boston, was made treasurer. C. L. F. Robinson and F. C. Nichols are the vice-presidents; A. L. Ulrich is secretary, and W. H. Penfield, assistant treasurer.

One of the three blast furnaces of the Wharton Steel Company, at Wharton, N. J., will go out at the end of the month, after a remarkable campaign of 4 years and 11 months on the present lining. The furnace will be relined and thoroughly overhauled.

### Steel Corporation Employees' Bonus and Stock Subscription.

The following statement has been issued from the office of Chairman E. H. Gary of the United States Steel Corporation, concerning the annual bonus distribution and the stock offered for subscription by employees:

The United States Steel Corporation is distributing a bonus to the officers and employees of the corporation and subsidiary corporations in accordance with its annual practice based on circular letters issued at the beginning of 1908. The amount is determined as usual by the annual earnings. The sum distributed for 1909 amounts to a little over \$2,000,000. This will be paid, 60 per cent. in cash and 40 per cent. in preferred stock at 124 or common stock at 90, in accordance with the wishes of the recipients, so far as practicable and convenient, and deliverable upon conditions specified in circular letters.

Also, the usual opportunity will be given to subscribe for 25,000 shares of the preferred stock of the corporation at 124 upon usual conditions stated in circular letters.

### Labor Notes.

A special organizer of the International Association of Machinists has been at work in the Pacific Northwest most of this year organizing nonunion machinists with a view to a demand for an eight-hour day and an increase of 50 cents a day in wages. The plea is made that there is not enough work to go round and reducing hours will supply work for all. The bulletin of the United Metal Trades Association of the Pacific Coast says on this point that it is impossible to get enough good machinists to do the work when business is normal, and that to-day it would be hard to get a dozen first-class men in Seattle and Portland.

In a bulletin issued from the Detroit office of the National Founders' Association reference is made to recent demands upon foundry proprietors in which the union seeks to put journeymen floor molders, bench molders and core makers on a parity. Various differentials have existed heretofore which it now seems to be the desire of the union to eliminate. It is stated that core makers and bench molders are contending that as they pay the same rate of dues, 40 cents a week, they are entitled to the same consideration as floor molders in connection with wage demands. A resolution was passed by the 1907 convention of the molders' union instructing the officers to use their best endeavors to eliminate the differential in the molding industry. In but few districts is there a recognized minimum wage rate for core makers. It will be the effort of the union to establish such a minimum and eventually to bring it up to the level of the floor molders' minimum.

**A New Blast Furnace at Cleveland.**—Appropriations have been authorized for a new blast furnace at the Central Works of the American Steel & Wire Company, Cleveland, Ohio, making four in that group, all modern stacks.

The Pennsylvania State Railroad Commission, which is now engaged in an exhaustive review of the rate question, especially in its relation to charges for the transfer of cars of scrap and other material for iron and steel works and foundries as made by one railroad in handling cars offered by another, has also determined to take up the subject of boiler inspection on steam railroads. It recently asked the railroads operating in the State seven questions as to their methods of inspection of locomotive boilers, including statements of frequency of inspections and by whom. Scores of answers have been received, and the commission has named Prof. P. B. de Schweinitz of Lehigh University to digest the reports and prepare a synopsis with recommendations upon which will be based such legislation on the subject as the commission may deem expedient.



## The Machinery Trade.

NEW YORK, December 22, 1909.

The year is closing with a good volume of business. All the machinery houses in this territory report that they have booked a good many orders this month, and most of them have done far more business than they transacted during the corresponding month of last year. There is an absence of inquiries just now which is probably due to the approaching holidays, as many manufacturers do not wish to open new propositions until after the first of the year. There have been no especially large lists before the trade of late and the orders closed during the week were for small lots of equipment. The demand was for a general line of machinery and, if anything, the machine tool branch of the trade is the busiest. Judging from the inquiries on hand, it is probable that there will be something of a lull next week; but this is no more than should be expected at this time of the year and the trade is confident that the new year will bring a large demand. The textile industries and the cotton mills seem to be especially active just now and are calling for considerable machinery, including power equipment.

Manufacturers of cotton mill machinery are having a good deal of trouble in keeping pace with the demand and in some lines of special equipment orders are delayed several weeks. This condition is unusual in that branch of the trade. The demand for power machinery is not so strong as it was a few weeks ago. Manufacturers of foundry equipment and supplies are busy and the foundries themselves are active. There is a decidedly heavy demand for machinery castings, and from all accounts good prices are being obtained. It will be remembered that early in the year most machinery manufacturers were reluctant of making long time contracts. It is apparent that some of them underestimated the demand and now they are obliged to order castings as they need them, as foundrymen who were heretofore anxious to get orders on their books are refusing to make contracts extending over any great length of time. Prices are being stiffened all along the line and some advances are reported.

The next annual convention of the Southern Supply and Machinery Dealers' Association will be held at Atlantic Beach, Fla., near Jacksonville, April 6, 7 and 8.

### Meeting of New York Machinery Dealers.

An important meeting of machinery dealers of New York and vicinity was held December 15 at the Machinery Club, at which were discussed a number of matters which require adjustment between machinery dealers and manufacturers. The meeting was attended by Wallace M. Pattison, president of the National Supply and Machinery Dealers' Association, and addresses were made by Charles A. Moore, president of Manning, Maxwell & Moore; Henry Prentiss of the Prentiss Tool & Supply Company and others. In addition to hearing a number of grievances which dealers have against manufacturers, the assemblage discussed the question of working with the manufacturers to bring about an increased differential when there is a lack of sufficient profit on any line of goods, and the question of urging manufacturers to establish resale prices which afford a fair margin of profit was brought up. The meeting also discussed the methods of co-operating to eliminate direct competition with the manufacturers. In this connection Mr. Pattison called the attention of the meeting to the methods adopted by the association he heads. He said that through the association's system members of the association are kept advised of cases where manufacturers are directly or indirectly competing with them for business, and the suggestion is made that the matter be taken up with such manufacturers and the request made that quotations be so revised that this competition may be met at a profit. The speaker stated that it is preferred that the manufacturers discontinue such practice, but this request would not be strictly lawful and the other serves the purpose quite as well. Further reasons advanced to show the good of the National Supply and Machinery Dealers' Association were that it induces manufacturers to steady the market in times of a crisis when a reduction in prices would mean material loss to the trade in general, and by bringing about a greater uniformity of terms on the part of manufacturers and by inducing those manufacturers whose terms are net or who grant a discount of less than 2 per cent. as a premium for cash in 10 days, to extend a cash discount of 2 per cent. for payments within 10 days from date of invoice. He also said that the association constitutes a classification board, so that manufacturers may be informed as to the character of business being conducted by various parties in order to prevent equipment companies organized by consuming corporations from buying.

Although the Pennsylvania Railroad and the Hudson & Manhattan Railroad have both been large buyers in this market of late for equipment for their dual enterprises in constructing short lines to Newark, it is evident that much more equipment will have to be bought before the scheme

of the two railroad companies is carried out. The Pennsylvania Railroad Company is constructing a line from Harrison, N. J., through its uptown tunnel to its new terminal, which is to be a branch of its New York division. This line will extend over the Jersey meadows, under Bergen Hill and under the North River through the Borough of Manhattan and under the East River, connecting with the Long Island Railroad. Most of the work on this line has been done, but there is still to be built a large transfer station and yard at Harrison, N. J., where will be located some facilities for making repairs, air compressors and other terminal machinery equipment. The Hudson Companies will build a line over the existing tracks of the Pennsylvania Railroad between Jersey City and Newark, and this work, it is understood, will be begun shortly. The company's present power house will probably take care of the line, but some additions will have to be made and, as the company will do the work soon, construction equipment will be needed.

It is evident that the plans of the General Electric Company to build a large plant at Erie, Pa., will soon come to a head, as the company is now negotiating with the authorities of that city with a view to getting permission to close certain public streets. The company owns 700 acres of ground at Erie, extending from the Lake Shore Railroad to the lake front, and it is reserving 300 acres for the new plant and the other 400 acres are to be used for residences for the employees of the company. The ground was purchased more than two years ago, but at the time of the panic the plan was abandoned for the time being.

Bids will be received at the office of the President of the Borough of Brooklyn, in the Borough Hall, on Wednesday, December 29, for material for the reconstruction and repairs of the mechanical plants at caissons No. 2, at Coney Island, and No. 4, at Sheepshead Bay. The requirements include one 10-in. centrifugal pump and engine, two 150-hp. steam boilers, two steam feed water pumps, one feed water heater and one iron stack at caisson No. 2, and one centrifugal pump and engine to be installed at caisson No. 4.

### New Machinery Requirements.

Plans for the construction of the lift locks for the Erie Barge Canal at Lockport, N. Y., are nearly ready for final consideration by the barge canal engineers and the reception of bids. The work will involve the expenditure of about \$1,500,000. The lift locks will occupy the site of the present series of gate locks, which will be torn out. The present locks, which are arranged in two tiers side by side, will be removed one tier at a time, leaving one tier in service while the new lift locks are under construction, as about two years will be required for the construction of the new locks.

The Rome Soap Mfg. Company, Rome, N. Y., is arranging to build two additions to its plant. One building will be a two-story structure, 145 x 160 ft. in size, and the other will be a three-story building, 30 x 105 ft. The buildings will be constructed of reinforced concrete and plans are being prepared by the Houchin-Aiken Company, 45 Fifty-third street, Brooklyn. This company is also attending to the engineering details.

The Otis Elevator Company has been buying some machinery of late from Albany and some local houses booked some good business through their branch offices in that vicinity. The machinery is for the company's plant there and it is said that further extensions, requiring additional machinery, are being planned.

The Pennsylvania Railroad is planning to install an electric plant in its Columbia yards at Pittsburgh, Pa., for the purpose of operating machinery in its repair shops there. According to people in the trade who are familiar with the company's affairs, no purchases for this plant have yet been made.

A new company has been formed to take over the property of the Mobile Portland Cement & Coal Company of New Orleans, La. This company owns a large tract of coal land on the Warrior River, near Tuscaloosa, Ala., and some cement properties at St. Stephens, on the Tombigbee River. It is understood that the new interests will construct some large cement plants.

The Breeze Carburetor Company, Newark, N. J., is in the market for power plant apparatus, including engine, dynamo, boiler, heater, pumps and steel stack.

An electric generating unit of 200 hp. is required by the Walter D. Carpenter Company, 39 Cortlandt street, New York, together with auxiliary machinery.

A power house, with engine driven generating apparatus, will be built at Hilton, N. Y., by the Hilton Electric Light, Heat & Power Company. Large boiler capacity will be provided.

Some pneumatic and pressure tools, as well as other machinery will be added this season to the equipment of Levering & Garrigues, West Dunellen, N. J.

The Stevenson Construction Company, Long Island City, N. Y., is in the market for complete power plant equipment of 200 to 300 hp. for a new factory building.

It is generally understood that Congress will appropriate sufficient funds to build a new foundry at the Portsmouth, N. H., Navy Yard. \$50,000 was previously appropriated for the buildings.

## Milwaukee Machinery Market.

MILWAUKEE, WIS., December 21, 1909.

The market for machinery and tools of all kinds continues firm and prices have strengthened considerably within the past two weeks. At the same time offerings of material used in shops and foundries are more liberal and purchases can be made at present on generally better terms than heretofore. This appears to be due both to increased production and to the usual slackening in current demand just prior to taking account of stock for the year. Concerns that have adopted the perpetual inventory system find themselves advantageously situated in this respect, as they are able to readily determine their requirements and take prompt action whenever a favorable opportunity for buying presents itself.

In the line of power equipment an interesting situation has developed here as between steam turbines and Corliss engines, both of which are largely produced in this State. The Wisconsin Engine Company, Corliss, Wis., declares that it will guarantee its engines to take less fuel than any type of steam turbine ever constructed, when running under the same conditions, and it is making a sales campaign on that basis. Simultaneously other builders announce that there are more steam engines being sold to-day than at any previous time, and that because of the competition of the turbines these engines are almost uniformly of better design than those formerly on the market. The Allis-Chalmers Company of this city reports that shipments of engines from its works average four to five a week, and a similarly large business is being done by other manufacturers in proportion to their capacity.

An engineer specializing in street railroad construction, who was here recently, states that many machine tool builders and supply houses are overlooking one very prolific source of business, namely, the repair shops now being put in by both new and existing traction lines. At present the tools for these maintenance departments are largely picked up in the local second-hand machinery markets or represent the discards of shops in the vicinity, but there is a good opening for new tools of the latest improved types, such as were installed last year in the repair shop of the Milwaukee Northern Railway and will be purchased shortly for the new buildings now being planned by the Milwaukee Electric Railway & Light Company.

An event which is regarded locally as of considerable importance to Milwaukee from an industrial standpoint was the visit here last week of a large party of operating heads and their engineering assistants from some of the principal steel mills of the country. This included officials of leading independent companies, such as the Jones & Laughlin Steel Company, Republic Iron & Steel Company, Pennsylvania Steel Company and Maryland Steel Company, as well as representatives of the American Steel & Wire Company, American Sheet & Tin Plate Company, Tennessee Coal, Iron & Railroad Company, Indiana Steel Company, Carnegie Steel Company, Illinois Steel Company and other subsidiary companies of the United States Steel Corporation. The party was brought here in a special train from Gary, where the new mills had been visited, and on the following day, the 15th inst., made a tour of inspection of the works at West Allis, being entertained at luncheon and dinner by President W. H. Whiteside of the Allis-Chalmers Company. Among the members of the party were Charles Dinkey, Homer Williams, D. H. Cobble, W. W. Wigham, E. E. Slick, A. Ahlen, Sidney Dillon, W. C. Carroll, E. W. Messler, James Scott, James Horton, Harry Davis, J. W. Murray, Humphrey Miller, A. R. Hunt and Harry Stevens, Pittsburgh, Pa.; C. Bacon, L. Holmboe, F. Gasche, Charles Mack, James W. Gardner and Charles McDonald, Chicago; George Weisner, Mingo Junction, Ohio; J. V. W. Reynolds, Steelton, Pa.; John Oursler, Newcastle, Pa.; James McDonald and D. R. Shover, Youngstown, Ohio; H. A. Barrow and D. B. Quarries, Cleveland, Ohio.

The Wisconsin Bridge & Iron Company, Milwaukee, has contracted for the structural steel work on a large factory building to be erected by the J. W. Wells Company, Menominee, Mich., the machinery requirements of which have previously been mentioned in this report. Bids on an extensive line of power equipment are now being taken.

The Fibre Development Company, Appleton, Wis., has prepared plans for a 40-ton sulphite mill to be built at a northern point by Frank Becker, Kaukauna, Wis. A large battery of steam boilers, one or more Corliss engines or turbines, dynamos, motors, shafting, belting, digesters, grinders, &c., will be required.

The Hippe-Steiner Mfg. Company, Chilton, Wis., has broken ground for an addition 60 x 70 ft. to its machine shop. The output of gasoline engines will be increased and automobile repair parts manufactured. Some new tools are being arranged for.

Specifications issued by Kirchoff & Rose for the new power plant of A. H. Weinbrenner & Company, Milwaukee, call for three large steam boilers, four pumps, an

open feed water heater, engines aggregating 425 hp., 75 kw. generator, switchboard and other apparatus. The bulk of this machinery is understood to have been already contracted for.

From Tomah, Wis., it is reported that the Chicago, Milwaukee & St. Paul Railway will erect a shop there for building hand cars.

The city of Wausau, Wis., is considering the construction of a new pumping station, the probable choice of equipment being motor driven centrifugal pumps.

A steam turbine and alternating current generator of 1000 kw. have been decided upon for increasing the capacity of the Sheboygan Light, Power & Railway Company's power house at Sheboygan, Wis. Purchase of the new unit and accessory apparatus will be made about January 15.

Three water tube boilers, Corliss engine, dynamo, motors, pumps, heater, &c., will be required by the American Seating Company, Racine, Wis., for a new power plant and new factory buildings. The purchasing will be done at the company's offices in Chicago.

The Racine Steel Casting Company, Racine, Wis., is proceeding with the erection of an addition to its plant which will be the forerunner of more important extensions later on.

A new engine and possibly electric power plant will be added before long to the equipment of the W. C. Collar Company, Merrill, Wis.

The foundry of the Milwaukee Stove Works, a structure 150 x 400 ft., burned here on December 9. It will be rebuilt on a larger scale and furnished with the most modern appliances for both malleable and gray iron castings. Although forming the center of a group of buildings, the foundry was the only part of the works destroyed.

Centrifugal pumps driven by electric motors are to be bought by J. M. Kohler Sons Company, Sheboygan, Wis., to draw water directly from the river for fire protection purposes.

The Conradson Automatic Lathe Company, recently organized, is said to have decided upon the building of a steel frame factory 130 x 130 ft. at Madison, Wis.

An engine and generator of 200 hp., with condenser, exciter, dynamos, boiler, pump, feed water heater and other apparatus will be installed in the new power plant of the Kiel Furniture Company, Milwaukee.

Bids for an air compressor and reservoir, steel water tank, fire pump, &c., will be taken by the county board at Racine, Wis., for use in protecting public buildings.

The local office of the Herbert Boiler Company has taken contracts here recently for steam generating equipment to be installed in a number of plants.

The Drew Elevator Carrier Company, whose factory at Waterloo was recently destroyed by fire, will establish a temporary plant at Watertown, Wis. The matter of rebuilding and re-equipment has not yet been determined upon, but will be decided next month.

Work is being started by the Badger Brass Company, Kenosha, Wis., on an addition to its shops. It is understood that no machinery has yet been contracted for.

The extension to the steel foundry of the Falk Company and the new plant of the American-Oxyhydric Company, Milwaukee, are nearly completed. Machinery has been fully purchased, but more will be needed a little later on.

Machinery for pulverizing, screening, &c., as well as coarse crushing, will be bought by the Michigan Quartz Silica Company. C. F. Keck, Milwaukee, is interested in the company.

The Brodesser Motor Truck Company will build a new factory with provision for electric light and power as well as heating and fire protection systems. The company's present plant is being advertised as for rent.

The Baker Mfg. Company, Evansville, Wis., manufacturers of pumps and specialties, is arranging for new power equipment, to consist of an electric generator of 150 hp. belted to Corliss engine, with exciter and other apparatus.

Boilers for 250 hp. automatic engine, electric generator and some small motors are required for the new central power and heating plant of the Monroe county buildings at Sparta, Wis., recently referred to. Address Chandler & Park, Racine, Wis.

Advices received here from Marshall, Mich., are to the effect that the New Process Steel Company of that place is arranging for the construction of steel and iron foundries, 60 x 120 ft., 25 x 100 ft., 75 x 100 ft. and 25 x 25 ft. Contracts for a part of the equipment are said to have been already placed.

The Milwaukee Western Railroad, Milwaukee, construction of whose line to Beaver Dam, Wis., was recently begun, is planning the erection of a large power station at Hustisford, Wis. The type of prime mover to be installed has not yet been decided, but the choice apparently rests between gas engines and steam turbines, both of which are used on traction lines out of this city.

The Garage Equipment Mfg. Company, Milwaukee, is placing on the market some improved tools for use in small repair shops, including a motor driven grinder with universal tool rest.



## Chicago Machinery Market.

CHICAGO, ILL., December 21, 1909.

General trade in the Chicago district is in the usual stage that precedes the holidays and the close of the year. There is a fair volume of current inquiries, and some business is being done, sales on the whole being very satisfactory for the season. Inquiries already in hand indicate that business after the first of the year will be very active in all lines. There will be little opportunity to do much business for next year's delivery on milling machines, as the factories are already booked up from June to September on the various sizes, and many buyers who have wanted earlier delivery have gone away disappointed.

The leading manufacturers of lathes recently announced an advance in prices, and some of them are getting several months behind on deliveries, so that orders taken now cannot be delivered until February to May. The lathe manufacturers have had a good run of business the past six months. One concern, it is understood, sold 138 lathes to one automobile factory, and general business has been good. In machine tools for railroad shop work the trade has also been active the past fall. There have not been many large lists, but there has been a steady run of orders for one or more machines at a time. One difficulty which the railroads encounter in making up a large list is that their appropriations will not cover their requirements. When the shop officials make up a list their only record of prices on which to estimate cost is what they paid 10 or 20 years ago. The great improvements that have been made during that time result in a machine of the same class and size costing a great deal more money, the price in some cases having doubled. The shop officials find themselves in an embarrassing position, when the appropriation they have asked for does not cover more than half the equipment which they expected to purchase. This has occurred recently on a list of the Oregon Short Line. In this particular case, however, the list was only submitted to a few houses and it is understood that only one house in Chicago had an opportunity to bid on the business.

The supply trade is very active. There is a rush of orders from railroads, from manufacturers and from machine shops all over the country, for small tools, supplies and materials, and the houses which make a specialty of this trade have had difficulty in keeping up their stocks. In some cases they have had to get hurry shipments of supplies which were ordered to come in after the first of the year. This is an indication of the strength of the machinery market, as it shows that the machine shops are full of business.

The Puritan Electric Heater Company, Detroit, Mich., manufacturer of electric flat irons and electric heating appliances of every description, has let contract for the erection of a new factory. Most of the machinery to be installed will be removed from the company's present works. The new plant will be ready for operation by February, 1910.

The Mexia Ice & Refrigerating Company, Mexia, Texas, has increased its capital stock from \$40,000 to \$60,000, and will erect a 20-ton ice plant at Teague, Texas, and another at Mexia. A bottling plant will be installed in connection with each plant.

The Rockport Drain Tile Company, Rockport, Ind., is constructing a building and kilns for the manufacture of drain tile. There will be a drying room 50 x 140 ft. with four floors and three 40-ft. kilns, which will be equipped with modern machinery, including boilers, pugmill, self feeder and tile machine, together with rails, tracks, cars, &c. None of this equipment has been purchased as yet.

The H. Kind Baking Company, Elgin, Ill., is erecting an addition 40 x 80 ft., into which the following equipment will be installed: One 25 hp. boiler, one 15 hp. engine, one dynamo and freight elevator and steam heating equipment. We are advised that none of this equipment has been purchased.

The Flint-Lomax Electric Mfg. Company, Denver, Colo., is erecting a new machine shop at a cost of about \$6000. The company advises that it is not in need of any new equipment at the present time, but will be in the near future.

An expenditure of \$1,000,000 has been authorized by the Street Railway Company, Omaha, Neb., for improvements to its power plant. Plans for the plant have been ordered, and upon completion and approval the work of construction will begin. The new plant will be an addition to the present one and will make the power station of the street railway company one of the largest of its kind in the West, with a capacity sufficient to meet the increasing demands of Omaha, South Omaha and Council Bluffs for many years.

The Nebraska Portland Cement Company, Clayton McLaughlin, president, 322 Midland Building, Kansas City, Mo., has filed articles of incorporation and will erect a \$1,000,000 plant to work the cement bluffs near Superior, Neb. Options on land needed for mining purposes and for sites and right of way have been closed.

Alexander Dodds, 181 Canal street, Grand Rapids, Mich., manufacturer of special wood working machinery, has incorporated his business under the corporate title of the Alexander Dodds Company, capitalized at \$63,000.

The National Iron Works, Ltd., Toronto, Canada, has awarded a contract for the erection of a building 104 x 314 ft. to manufacture gas and water pipe of all sizes. Cawthra Mulock is president of the company and Gordon Perry secretary.

The Kewanee Boiler Company, Kewanee, Ill., has purchased four acres of land for an extension to its factory. Plans for the improvements have not yet been perfected, but the company expects to erect an addition to its boiler shop, build an entire new foundry and machine shop, and make additions to its radiator factory. The buildings contemplated will contain something over 90,000 sq. ft. of floor space. New machinery and equipment to be installed has not yet been decided upon.

The Sweet Candy Company, Salt Lake City, Utah, will erect a new factory to cost \$150,000, with an additional expenditure of \$50,000 for machinery and equipment. The building will be four stories and basement, having a total floor space of 50,000 sq. ft., and will be equipped with an automatic sprinkling system. All machinery in the factory will be operated by individual motors, and for this service about 40 motors will be required. In addition to the main building, a 30 x 70 ft. power plant will be erected which will contain two 125 hp. water tube boilers, one 150 hp. Corliss engine, direct connected with a 100 kw. generator. The company will begin the erection of its new factory at once with the expectation of having it ready for occupancy within the next eight months.

The United States Machine Company, manufacturer of refrigerating machines and gas engines, with plants located at Detroit, Mich. and Angola, Ind., is increasing the equipment of the latter plant so as to double its capacity over that of its Detroit factory. Both plants are designed and built along the most modern lines for economical and systematic manufacturing.

The Simmons Manufacturing Company, Kenosha, Wis., maker of brass and iron beds, is preparing plans for the erection of two new buildings, one of which will be 90 x 200 ft., six stories, mill construction, and the other 160 x 400 ft., two stories, mill construction. The latter will be used as a warehouse and shipping room. Most of the machinery to be installed will be of a special nature and will be built in the company's own machine shop.

Owing to its increasing business the Hanna-Brackenridge Company, Fort Wayne, Ind., has been obliged to seek larger quarters, the company has purchased the Clark Showcase Company's buildings in that city and is now engaged in getting the place ready for occupancy in order to begin operations in March or April. The main building is of fireproof construction, 60 x 250 ft., two stories, with two wings forming machine shop and blacksmith shop, foundry, engine and boiler room. The company will manufacture a line of woodworking machinery in addition to its business of rebuilding machines.

The Progressive Light & Power Company, Decatur, Ill., incorporated with capital stock of \$100,000, has applied for a franchise for furnishing electric light and power to the city of Decatur. The company owns a plant containing a 24 x 48 x 48 cross compound engine, which will be direct connected to a 900 kw. 2300 volt, 60 cycle, three-phase alternator. The company expects to install one turbine 300 kw. at present and later on a 600 kw. turbine, neither of which has been purchased.

The Reeves Pulley Company, Chicago, has moved into new and larger quarters at the northeast corner of Clinton and Monroe streets. This move was necessitated by the rapidly increasing demand for its power transmission. In its new location the company has increased its facilities, enlarged its stock, and is equipped to care for all emergency calls and the prompt execution of all orders. In addition to a large stock of Reeves wood split pulleys, the company carries a complete stock of general power transmission.

## Philadelphia Machinery Market.

PHILADELPHIA, PA., December 21, 1909.

Local machinery merchants closed a better volume of business during the past week than was generally anticipated. The demand was not confined to any one class of tools, the orders booked covering pretty generally the full line of medium size equipment. No individually large orders came out, sales being almost entirely confined to single tools for replacement or minor extensions, and subject to reasonably prompt delivery. Under the circumstances, the trade takes a more favorable view of the situation regarding near future business, particularly as there are quite a few likely inquiries out, the bulk of which are small individually, although there is one for a good quantity of equipment for the Bergdoll Automobile Company, which has been before the trade under varying conditions several times here-



tofore, and now looks as if it might develop into business, at least as far as the company's earlier requirements are concerned. Several smaller equipments for proposed extensions to plants are in sight, but are not expected to develop into definite shape until early in the coming year.

Industrial establishments are experiencing the usual end of the year slowing down in new business, although specifications on old contracts continue heavy and plants are still operating at top capacity. Purchases by such interests, however, are usually curtailed at this season, owing to the approaching annual inventories. The railroad demand is at a standstill, but developments of a more active nature are expected after the turn of the year. Manufacturers of tools are booking a fair volume of business, although the usual year end inactivity is also being experienced in some lines. Plants are fairly well occupied, and in some cases are operating above average capacity, and deliveries on the more popular tools in various lines are gradually hardening. On the whole the undertone of the market is considered stronger and the outlook for an increased volume of business in the near future is looked upon as more favorable.

In the second-hand machine tool field conditions show no appreciable change; buying continues more or less irregular, although merchants report a fair aggregate volume of business. The demand has been quite general as far as class of equipment is concerned, covering the usual range of wood and metal working machinery. The demand for second-hand engines is still unsatisfactory; that for boilers of medium horsepower is fairly active. Inquiries for new power equipment have been somewhat more numerous, and a good volume of new business is before the trade.

No particular change is to be noted in the demand for castings. Steel casting plants are still actively engaged, with deliveries gradually becoming less satisfactory. Gray iron foundries report a good run of business in various classes of work, and this branch of the trade shows a trifle more activity.

The Union Saw Company, Williamsport, Pa., has about completed plans for the erection of a new plant in Frackville, Pa.

The Quaker City Box Company will remove from its present location, 701 East Girard avenue, in this city, to Glenwood avenue and American street, on completion of a two-story factory building, to be erected for them by the Philips' Pressed Steel Pulley Works. The building will be of brick, 55 x 120 ft. on the ground plan, and will give the Box Company largely increased facilities. Information regarding probable further requirements were unobtainable at this time.

A charter has been granted the Phoenixville, Valley Forge & Strafford Street Railway Company, which will build a new line 10 miles long, connecting Phoenixville and Strafford, Pa., by way of Valley Forge. The capital authorized is \$60,000, the following incorporators being named: Thos. E. O'Connell, West Chester, Pa., president; O. E. Thompson, John A. Dismant, C. F. Boden, A. W. Kley, E. C. Meir and I. E. Miller, Phoenixville, Pa.

The Mumford Molding Machine Company has been organized to take over the business and manufacture the line of foundry molding machines heretofore sold by the E. H. Mumford Company of this city. The machines will be made by the Q M S Company, Plainfield, N. J., at which point the executive offices of the new company will be located. The sales office of the company will be established at 30 Church street, New York City. W. D. Sargent is president of the company and E. H. Mumford vice-president and general manager. This company is now building for the International Steam Pump Company, for its Harrison, N. J., plant, the largest jolt ramming machine, it is said, that was ever built. The machine will have a 6 x 9 ft. table, a 32-in. plunger and have a capacity of ramming half molds of 20 tons weight. It will operate under 100 lb. air pressure.

The Enterprise Mfg. Company, Third and Dauphin streets, has begun work on its new plant, to be located on a portion of an 81-acre tract at Cornwells, Bucks County, Pa., near this city. The new plant will be operated as an adjunct to the present one. Four large buildings are included in the new operation. They will be one story high, of reinforced concrete; the main building will be 120 x 500 ft., with a secondary structure 40 x 120 ft. Power houses will also be erected. The new plant will have exceptional shipping facilities, as the location is adjacent to both the Delaware River and the New York Division of the Pennsylvania Railroad. The company advises that it has made every arrangement for its power equipment, as well as general equipment for the new plant.

### Cincinnati Machinery Market.

CINCINNATI, OHIO, December 21, 1909.

While the customary holiday spirit of middle December is none the less marked, in fact seems rather exaggerated if anything, all machine tool establishments and machinery manufacturers in this market are running quite as full as when the fall inquiry came on and heavy buying began.

Among the dealers, however, there is a little falling off in inquiry and sale, some of the larger projects having been temporarily shelved until the new year. There is a good volume of sales of single and the smaller tools, and in medium and smaller sized electric power units a good business is reported. A number of the larger dealers and tool manufacturers have in hand lists of requirements that will be purchased early in the year, although the railroads have not as yet come into the market for their needs to any appreciable extent. A straw that shows the optimism of the tool manufacturer is the disposition of these manufacturers to order castings in quantity and to secure deliveries as rapidly as possible. The larger jobbing foundries in this district are consequently rushed just at this period, and all are pouring heats of maximum size and employing additional skilled help wherever available.

The relations between the toolmaker and the foundryman in this market are very much improved and more pleasant than since the fall of 1907. A few tool manufacturers have recognized the foundryman's contention for a small advance, because of the advancing costs of supplies and labor, and this advance is on an average about \$2 per ton in the charge; as, for instance, where the sliding scale basis of computation fixes the cost of castings at \$2.50 on \$12 iron this basing price is advanced to \$2.60, and so on. Foundries here are pouring heats daily of on an average 12 tons each.

A feature of the outlook for 1910 in this field is the preparation by manufacturers for improvements and enlargements of plants. Officials of the International Steam Pump Company have just finished an inspection of the Cincinnati plant known as the Laidlaw-Dunn-Gordon Company, in Elmwood place, and authorized expenditures of \$300,000 for improvements. The visiting officials who conferred with General Manager William Goodman here were Vice-President L. P. Feustman and Walter Laidlaw, who was formerly an officer in the local establishment. An addition to the foundry 120 x 175 ft., of brick and steel construction, will be one of the first improvements, and there will also be built a new erecting shop, 120 x 200 ft., and an addition to the boiler plant. A good part of the appropriation will be used in the purchase of machinery equipment. It is calculated that the capacity of the Cincinnati plant will be increased 30 per cent. when the improvements are completed.

Stockholders of the Buckeye Traction Ditcher Company of Findlay, Ohio, met on Monday afternoon in that city and voted to increase the capital stock of the concern from \$100,000 to \$3,000,000. The money secured is to be used to build a new factory, the designs for which are said to indicate one of the largest structures in the State for manufacturing purposes; 150 to 200 additional men will be employed when finished.

The Sayers & Scoville Company, Brighton suburb, Cincinnati, is planning a monster fireproof addition to its factory. The new building will be devoted exclusively to the manufacture of automobile trucks. The improvement is to be 140 x 175 ft., and the officials will decide within a week or so as to the height and other features. The concern entered the automobile truck field only a few months ago, but its success was so instantaneous that it determined to enlarge and improve.

Directors of the Monitor Stove & Range Company, Cincinnati, are planning to greatly enlarge and improve its plant in the West End. An addition to the factory will be two stories high, 31 x 92 ft., and this will furnish additional facilities for the nickeling departments. A new warehouse will be 60 x 120 ft., wood construction, with sheet iron surfacing. Bids are to be opened within a few days and work of construction will go forward at once. Architect Harry Hake has charge of the building work.

At the twenty-second annual meeting of the Engineers' Club of Cincinnati, held in the rooms of the Literary Club on December 16, J. Nelson Caldwell was elected president; C. H. Meeds, vice-president; E. A. Cast, secretary, and John T. Faig, Robert Anderson and C. H. Riggs, directors. The retiring president, F. M. Crocker, read a very interesting paper on "Building Construction in Cincinnati." Mr. Crocker evidenced a very thorough knowledge of the elements entering into building construction, and particularly in the city of Cincinnati. He dealt understandingly also with the subject of fire prevention and the various improvements made in the character of building work during the past decade. He further dissected the new building code, pointing out the features which will insure betterments in building. He urged upon the membership the necessity for united effort toward bringing about a greater Cincinnati constructively. The club is in a very flourishing condition, financially and otherwise.

The Indianapolis Foundry Company of Indianapolis, Ind., has filed new articles of incorporation with the Secretary of State of Indiana, its former corporate period having expired. The capital stock remains the same—\$50,000—and the incorporators likewise—Frank W. Lewis, Frederick B. Whitlock and Emma M. Lewis.

The Eaton Gas Engine Company of Eaton, Ohio, is a new organization to manufacture gas engines. Capital stock

is \$15,000 and the incorporators are L. L. Brown, John E. Parker, A. L. Christman, R. J. Scheid and F. E. Vaughn.

The Houston, Stanwood & Gamble Company, Covington, Ky., has increased its capital stock from \$200,000 to \$400,000, and will begin at once some important improvements in its extensive plant. Engines and boilers, portable and stationary, are its specialties.

## New England Machinery Market.

BOSTON, Mass., December 21, 1909.

December is proving a first rate month among the dealers. Most of them are booking a comfortable total of orders. One house will have the best month of the year in the amount of charges on the books, though some of this machinery was ordered several months ago. The tool steel business is exceedingly good. The dealers who handle American steels are not responding easily to requests that they place contracts at advanced prices. They prefer to watch developments, knowing that if the price advances much they will be able to import all the steel they may need without a sacrifice. Merchant steel is in great demand, but the dealers are handicapped by their inability to get deliveries, from which trouble they are promised little relief from the mills. Woodworking machinery is experiencing a normally dull season, but inquiries indicate that next year will be an exceedingly good one. The railroads are rushed to the limit. The Boston & Albany division of the New York Central had the best month's business in its history in November, and the other New England railroads are probably equally prosperous.

The American & British Mfg. Company, Bridgeport, Conn., is making plans for an extension of its plant in that city, involving the erection of new buildings and the purchase of many special tools. The company now manufactures about 5000 automobile motors annually, and will expand to bring the product up to 10,000.

The Waterbury Mfg. Company, Waterbury, Conn., manufacturer of brass goods, has increased its authorized capital stock from \$1,000,000 to \$2,000,000. It is understood that the new stock, when issued, will be taken by the present stockholders.

Work has begun on the new factory at Charlestown, Vt., of the Superior Tap Company, Springfield, Vt. The building will be 40 x 200 ft.

The Massachusetts Saw Works, Chicopee, Mass., has brought out a new hacksaw machine, having a capacity from 1/8-in. to 6-in stock.

The Springfield Belting Company, 216 Worthington street, Springfield, Mass., has been organized with John B. Vanderzee and Walter F. Rodhouse as the partners. The company will manufacture leather belting and will deal in general mill supplies and specialties. The partners have been connected with the leather belting industry for many years, with one of the large New England manufacturers. A. B. Spitzel, the superintendent, has had 10 years' experience in that position for one of the Boston factories.

The Munro-Eastwood Pen Company, New Britain, Conn., has purchased a large building at Eastwood Park, in that city, where new machinery will be installed for the production of new novelties. The company manufactures pens, stationers' supplies and can openers. The business has outgrown its present quarters.

The plant of Radcliffe Brothers, Shelton, Conn., recently damaged to the extent of \$100,000 by a boiler explosion, will be rebuilt.

The American Thread Company will erect a large bleach house at Willimantic, Conn., in the spring.

It is stated at Portland, Me., that a new linoleum factory will be built in that city to cost \$150,000 by a company of which George H. Davis is the promoter.

The business of George B. Gruman, Branchville, Conn., manufacturer of ice harvesting tools, has been incorporated in Connecticut as the Gruman Ice Tool Works, Inc., with a paid in capital of \$20,000. The reason for the incorporation was the need of new capital with which to take care of an increasing business. The title to the plant of the W. H. Davenport Firearms Company, Norwich, Conn., has been vested in the Thames Loan & Trust Company of that city, which will rent it with the equipment, if possible, and otherwise will dispose of the machinery.

The plant of the Duplex Roller Bushing Company, Belfast, Me., was purchased at receivers' sale December 20 by H. Holton Wood, Boston, the principle creditor. He was the sole bidder.

The New Haven Electric Mfg. Company, New Haven, Conn., will establish a factory at North Haven for the manufacture of electric switches and other electric specialties. It is a new Connecticut corporation with paid up capital of \$5000. John Fruin is president, William R. Hoyt vice-president, and Henry C. Barber secretary and treasurer. The two former officers are of the firm of Hoyt & Fruin, Cheshire, Conn., while Mr. Barber has been connected with the Trumbull Electric Company, Plainville, Conn.

The directors of the Middletown Silver Plate Company,

Middletown, Conn., are perfecting plans for a reorganization of the corporation with a view to increasing the business. No details are yet available.

The Colton Combination Tool Company, which has just moved its plant from Easthampton, Mass., to Chester, Vt., has reorganized with Gorham C. Parker, Hartford, Conn., as president, W. A. Feltt, Chester, vice-president, and Percy E. Heald, cashier of the National Bank of Chester, secretary and treasurer. Rosto E. Colton, the inventor of the combination tool holder which is the company's product, will remain with the business and have charge of the plant. The management expects to enlarge the capacity of its shop and will push vigorously the sale of the combination lathe tool holder. The new works will be ready for operation by January 1.

The contract has been awarded for the first unit of the plant of the Springfield Crude Oil Engine Company, Springfield, Mass., which will be located on the line of the Athol Branch of the Boston & Albany Railroad, off upper St. James avenue. This building will be 75 x 100 ft. The company is perfecting an internal combustion engine which uses crude oil as fuel. Its details have not been given to the public, but it is known that the machine has been given a long and severe test, with results most satisfactory to its inventor, William F. Miller, Boston, and to the Springfield capitalists, who have become interested as stockholders in the corporation, including among them some of the most prominent manufacturers of western Massachusetts. Howard R. Bemis of the Bemis & Call Hardware & Tool Company is the president and treasurer, and Everett H. Barney, president of Barney & Berry, Inc., is a director. The published plans call for the eventual creation of a great plant, consisting of 10 large buildings of steel and brick construction; also a power house. However, the development of the business will proceed gradually, and requirements will be very modest for the present.

The Boston Elevated Railway Company, Boston, Mass., has purchased 25 acres of land at South Boston, which will be the site of a great central power station, the purpose being, according to the statement given to the public, to supply from one plant the entire great system, using an alternating current, instead of employing the direct current from a number of smaller stations. The company has about reached the limit of its present power producing facilities. The system embraces the city of Boston and the immediate suburbs, and has grown rapidly. Other lines which will use large quantities of power are projected, notably the subway to Cambridge. Therefore it was necessary that provision be made for the immediate future, and the increase will be at South Boston. The land lies between the properties of the Walworth Mfg. Company and the Boston Edison Company. There is ample water frontage.

## Cleveland Machinery Market.

CLEVELAND, OHIO, December 21, 1909.

Business with the local machinery houses, which kept up remarkably well for December during the first half of the month, has fallen off considerably during the past week, and merchants look for a quiet spell until after the holidays. Some of the dealers, however, report that the demand for single tools is holding up fairly well, and business appears to be up to or above the normal for this time of the year. Inquiries are not so numerous as they were at the beginning of the month, but they are still fairly plentiful. In most cases these are from concerns that do not intend to buy immediately, but are getting prices with the view of placing orders soon after the first of the year. The number of these inquiries indicate that business will start out with considerable activity next month after annual meetings are held and plans for the year are outlined. Among the new inquiries that came in during the week are several from manufacturing plants that are planning additions early next year and will need from six to a dozen new tools. In power equipment some good sized inquiries are pending, and the demand for small and medium sized motors is holding up well.

The general manufacturing situation in metal working lines continues very satisfactory. Plants as a rule are running at their maximum capacity, and nearly all have enough orders on hand to keep them busy for some time. The demand for steel castings is now very good and foundrymen making steel castings are looking for somewhat better prices after the first of the year. The demand for light gray iron castings continues heavy.

The Cuyahoga Light Company, Cleveland, which is at present furnishing commercial lighting in a portion of the downtown business district, has been granted a franchise covering a large section of the city, and announces its intention soon to begin the erection of a new power plant. General plans for the plant have not yet been formulated.

The Cleveland Enameling & Mfg. Company, recently incorporated with a capitalization of \$50,000 by Henry Trenkamp and others, has completed a new plant on Quincy avenue, which was placed in partial operation this week.



The company will do vitreous enameling on sheet steel and cast iron. The plant consists of two buildings, one 125 x 60 ft., and the other a pickling room, 30 x 40 ft. The company will have four ovens.

The Orrville Pump & Furnace Company, Orrville, Ohio, has been incorporated with a capitalization of \$75,000, to operate the combined plants of the Orr Foundry Company and Service Pump Company of Orrville, and the Razor Furnace Company of Barberton, Ohio, which have been consolidated. The incorporators are George Wendling, Chris. Smith, S. M. Brennehan, Elias Conkell and H. A. Miller. The new company has under construction a foundry building, 70 x 110 ft.; a pattern and machine shop, 40 x 70 ft., and will soon build a power plant. Individual motors will be used for driving the machinery. The new factory, it is expected, will be ready for operation April 1. The Barberton plant of the Razor Furnace Company will be used for the present for assembling and warehousing.

The Ferry Cap & Set Screw Company, Cleveland, has just completed an extension to its plant, having added a third story to its building, 40 x 150 ft., giving the company a floor space of over 20,000 ft. Considerable new machinery will be installed, orders for which have been placed. This company states that the growth of its business made extensions to the plant necessary. It has all the orders it can fill, and the plant has been running overtime the greater part of the year. On the evening of December 17 the company gave a ball for its employees on the floor of its new addition.

The Millersburg Furnace Company, which recently leased the plant of the Royal Foundry & Machine Company, 1169 Marion street, Canton, Ohio, moved its plant from Millersburg, Ohio, to Canton last week. The company has changed its name to the Royal Foundry & Furnace Company. It will make gray iron castings and hot air furnaces.

The G. A. Swineford Company, Canton, Ohio, manufacturer of hardware specialties, has purchased the lawn rake department of the Gibbs Mfg. Company, Canton, together with patents and machinery. The Swineford Company reports that its business is in a very satisfactory condition and that it is several weeks behind on deliveries.

The American Roll & Foundry Company, Canton, Ohio, maker of rolling mill machinery, reports that its business during the present year is the largest in the history of the company. This company is now behind on its orders and has some large contracts on its books.

The Cleveland office of the Allis-Chalmers Company has received an order from the Wagner Stone Company of Sandusky, Ohio, for a No. 21 stone crusher, weighing 450,000 lb. This crusher will be installed at the company's Castalia, Ohio, plant, and with its present equipment will make it one of the largest stone crushing plants in the country.

The Cleveland Lock Company, maker of brackets, hinges, locks, &c., reports the business outlook is very satisfactory, having more orders on its books for delivery during the first three months of next year than ever before for a similar period.

T. C. Harris of Tecumseh, Mich., and Lester Dean of Fremont, Ohio, have under consideration the establishment of a plant in Toledo, Ohio, for the manufacture of cultivators, hay presses and other farm implements.

The Cleveland Wire Spring Company reports that it is crowded with orders for shop equipment and springs, and that its outlook for business during the coming year is most satisfactory.

The Board of Trustees of the Ohio Hospital for Epileptics, Gallipolis, Ohio, will receive bids on January 20, 1910, for two water tube boilers. Plans are on file at the office of the superintendent.

## Government Purchases.

WASHINGTON, D. C., December 22, 1909.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until January 4, Schedule No. 2063, for one 10-in. slotting machine.

The Bureau of Supplies and Accounts, Navy Department, opened the following bids December 14:

Schedule 1996, one open turret lathe: Bidder, 81, Jones & Lamson Machinery Company, Springfield, Vt., \$1500; 125, Pratt & Whitney Company, Hartford, Conn., \$2440.

Schedule 1999, class 81, six engine lathes: Bidder 35, Chandler & Farquhar Company, Boston, Mass., \$6379; 58, Frevett Machinery Company, New York, \$5380; 59, Fairbanks Company, New York, \$6490; 86, J. H. Johnson Company, Philadelphia, \$6512; 126, Prentiss Tool & Supply Company, New York, \$6214.

Schedule 2001, class 96, one direct current motor, one armature, switch drums, supports, &c.: Bidder 111, Morgan Engineering Company, Alliance, Ohio, \$844.25.

Schedule 1958, class 34, 12 hydraulic jacks: Bidder 67, R. H. Gray, San Francisco, Cal., \$747; 83, Joyce-Cridland Company, Dayton, Ohio, \$506; 92, J. B. Kendall Company, Washington, D. C., \$691.08; 109, Manning, Maxwell & Moore, New York, \$697.20; 135, H. A. Rogers Company, New York, \$566.40.

## Miscellaneous Machinery and Power Equipment.

Clinton J. Warren, Boston, is taking bids on gas engines and dynamos for a private power plant.

Pumping machinery will be contracted for about March 1, by the municipal authorities at Conway, Ark.

The Covington & Southwestern Traction Company, which is completing an electric generating station at Kingman, Ind., will be in the market for additional power and operating equipment a little later on.

The Newport Mining Company, Ironwood, Mich., is arranging for the installation of electric motors with which to extend its operations.

An engine or steam turbine power plant will probably be built within the next few months by the Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.

New boilers, pumps, engines, generators, switchboard, transformers, &c. will be required shortly by the Boone Electric Light Company, Boone, Ia., for a new power house.

The Madison River Power Company, Twin Bridges, Mont., will be in the market shortly for hydraulic turbines and dynamos with which to equip an electric power station now under construction in that vicinity.

A steel dam is to be built across the Trinity River at Fort Worth, Texas, according to reports from that city, and the Chicago Bridge Company is said to have the contract. This will be a unique structure, practically a succession of gates. The object is to provide for opening up the entire channel, when necessary, in time of flood.

Additional boilers and a pumping engine of moderate capacity are required for the power plant at Fort Robinson, Neb. Capt. F. T. Arnold is in charge of the projected improvements.

Ore reduction machinery, including stamp batteries, jaw crushers, feeders, samplers, &c., will be installed by the Alaska-Chandler Mining Company, New York, at one of its properties in the Yukon District, Alaska. Some of the equipment required has already been purchased.

The West Kentucky Coal Company, W. H. Cunningham, manager of mines, Sturgis, Ky., will be in the market by or before spring for considerable new equipment, probably including power and electrical apparatus.

Installation of a steam turbine unit of about 300 kw., doubling the capacity of the municipal power plant at St. Joseph, Mo., is under consideration, although no definite action has been taken by the city council to that end. A low pressure machine operating on the exhaust from the Corliss engine units may be decided upon in preference to a standard condensing turbine.

Plans for a pumping plant at Meridian, Idaho, are understood to have been ordered drawn in connection with the proposed water system.

A. M. Weidenbach, Bridgewater, S. D., is in the market for electric generating equipment. Contract for a power house has been let.

The Tompkins Cove Stone Company, Tompkins Cove, N. Y., whose new electrically driven crushing plant was mentioned some weeks ago, has contracted for 15 motors, in sizes from 20 to 125 hp., for operating it.

There will be a large demand for motors during the coming year in mining districts adjacent to Leadville, Colo., where the Leadville Light & Power Company is about to arrange for the erection of another power plant and distribution system.

A light manufacturing building, having a steam power plant of 300 hp., including electric dynamos, will be erected at Dayton, Ohio, by the Schwind Realty Company.

High pressure pumps for fire service are to be provided at Stonington, Ill.

Nelson Bros., Duluth, Minn., will build a new factory, obtaining electric power from the Great Northern Power Company, if present plans are consummated.

The authorities at Bedford, Ohio, are considering plans for the construction of a municipal pumping plant, although no formal action to that end has been taken.

The Compania Carbonifera de Sabinas, Coahuila, Mex., will install 60 ovens of the Koppel type.

The Southern States Portland Cement Company, Rockmart, Ga., will install more tube mills.

A turbine driven generating unit of considerable size will be added to the power equipment of the Uvalde Street Railway Company, Uvalde, Tex., upon completion of an extension of its lines to Batesville, about 25 miles distant.

Motor driven pumps for a municipal water system will be provided at Gilbert, Minn.

Power transformers will be among this season's requirements of the Monterey County Gas & Electric Company, Monterey, Cal.

The construction of a pumping station is under consideration at Creston, Iowa.

Additional power capacity will be required shortly by the Century Stove Mfg. Company, Johnstown, Pa.

An addition will be made at once to the plant of the



Wheeling (W. Va.) Stamping Works and new equipment provided.

A return tubular boiler is to be added before long to the power plant of the David Sears Lumber Company, Pearson, Ga.

The Webster City Electric Light Company, Webster City, Iowa, will buy a new dynamo of 200 kw., motor generator set and other electrical apparatus; also gasoline engine driven pump.

Several additional tube or ball mills, with operating machinery, are to be purchased by the Dewey Portland Cement Company, Kansas City, Mo.

A new power station will be built and completely equipped this winter by the Onaga Light, Heat & Power Company, Onaga, Kan.

A new boiler plant, pumps and Corliss air compressor will be installed about May 1, by the Vincennes Water Supply Company, Vincennes, Ind.

Joseph Sillyman & Company, Altoona, Pa., are reported to be in the market for a large quantity of power and coal mining machinery, including electric locomotives and hoists.

The Idaho Power & Transportation Company, Idaho Falls, Idaho, will be in the market before long for additional electrical machinery with which to extend the scope of its operations.

A 500-ton concentrating plant will be built by the Butte & Superior Copper Company, Butte, Mont. Electric power will be used throughout, including the installation of some motors of very large capacity.

The Globe Metal Company, Chicago, will build a refining plant equipped with machinery of the most modern design.

Machinery will be bought soon after January 1, for a 300-bbl. cement plant to be erected by the Mobile Portland Cement & Coal Company, Mobile, Ala.

John Gottbreht, Dunseith, N. D., will build a hydro-electric plant near that place. Machinery is to be contracted for in the spring.

The Automobile Supply & Engine Company is completing a plant at Fort Madison, Iowa, for the manufacture of gasoline motors. The initial equipment has been provided, but more will be required later.

The Dakota Gas, Electric Light & Power Company, Scotland, S. D., will install a gas producer and gas engine for direct-coupling to an electric dynamo. Order for the main equipment has been placed with the Minneapolis Steel & Machinery Company, but some auxiliary apparatus will be bought later.

Two pumping engines with capacity of 8,000,000 gal. daily and an electric generating unit are proposed for the new water works at Parkersburg, W. Va.

The repair shops of the Great Northern Railroad, Bellingham, Wash., which were recently burned, will be rebuilt for enlarged capacity, either there or at another junction point, and equipped with much heavier tools.

A new factory, with power plant, will be built by the Eyles Mfg. Company, Cedar Rapids, Ia.

The Lee Mercantile Company, Salina, Kan., will buy boilers, engine, dynamo, pumps and other machinery for a power plant to be installed by affiliated interests.

C. A. Meyer, Clarkfield, Minn., is in the market for an engine and generator, although it has not yet been decided whether gas or steam power will be used.

A. F. Carlson & Son, Attica, Ind., are in the market for several metal and woodworking tools, including lathe, shaper, punch and shears.

Construction of a pump house and water works system is under consideration at Asotin, Idaho.

A gas producer and gas engine are likely to be installed in the near future by Vincennes, Ind. 400 hp. is the capacity proposed. The purchase of additional motors is also contemplated.

Pumping machinery for a water system will probably be bought during the next year at Freewater, Ore.

Additional machinery will be provided this season by the Precise Company, Newcastle, Ind.

The Benson Light Company, Benson, Ariz., is preparing to install an electric power plant.

Pumping machinery for the water works planned at Sabetha, Kan., will be bought next month, a bond issue having been ordered for the purpose.

An addition equipped with electric motors, blower system, sprinklers and woodworking tools will be built at Lansing, Mich., by the Capital Furniture Company.

An electric dynamo driven by Corliss engine or steam turbine of about 750 hp. will be bought before January 1, by the Mason City & Clear Lake Railway, Mason City, Iowa, which is one of the oldest traction lines in the country.

Lyman C. Smith & Bros., Syracuse, N. Y., will soon be in the market for some light machine tools, including lathes and drills, for an addition to its factory.

A company has been organized at Huntington, W. Va., to take over the Industrial Iron Works and reopen them for the building of steam heating apparatus.

A Corliss engine of about 75 hp. is needed by the Kee & Chapell Company, Batavia, Ill.

The Joliet Steel Car Mfg. Company, Joliet, Ill., which has had the erection of a plant under consideration, will lease one instead, if a group of suitable buildings for the purpose can be found. The matter of equipment will not be taken up until later.

Some special machinery and power equipment will be required for the factory of the Eau Claire, Mich., Basket Company, which is to be rebuilt.

A large gyratory crusher plant will be installed some time this winter by the Monroe Stone Company, Monroe, Mich.

Pumping machinery of larger capacity is needed for the city water works at Clay Center, Kan.

A steam turbine or Corliss engine of 1500 hp., with 1000 kw. generator, will be required by the Geneva & Auburn Railroad, Seneca Falls, N. Y., for a new power house to be used in operating 15 miles of new track.

The Dayton Computing Scale Company, Dayton, Ohio, which is about to erect a new factory building, will buy a large line of electric motors for operating the machinery.

Kearney, Neb., is having plans prepared for a new water works system, the aggregate cost of which will be \$150,000.

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# CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

## IRON AND STEEL— Bar Iron from store—

Refined Iron:	
1 to 1½ in. round and square.....	¢ 2.00
1½ to 4 in. x ½ to 1 in. ....	¢ 2.20
1½ to 4 in. x 1 to 5-16.....	¢ 2.20
Rods—¾ and 1-16 round and square.....	¢ 2.20
Angles:	
3 in. x ½ in. and larger.....	¢ 2.25
3 in. x 3-16 in. and ½ in. ....	¢ 2.25
1½ to 2½ in. x ½ in. ....	¢ 2.25
1½ to 2½ in. x 3-16 in. and thicker.....	¢ 2.25
1 to 1½ in. x 3-16 in. ....	¢ 2.25
1 to 1½ in. x ½ in. ....	¢ 2.25
¾ x ½ in. ....	¢ 2.25
¾ x ½ in. ....	¢ 2.25
¾ x ½ in. ....	¢ 2.25
¾ x 3-16 in. ....	¢ 2.25
Tees:	
1 in. ....	¢ 2.50
1½ in. ....	¢ 2.60
1½ to 2½ in. ....	¢ 2.30
1½ to 2½ in. x 3-16 in. ....	¢ 2.30
3 in. and larger.....	¢ 2.30
Beams.....	¢ 2.25
Channels, 3 in. and larger.....	¢ 2.25
Bands—1½ to 6 x 3-16 to No. 8.....	¢ 2.45
"Burden's Best" Iron, base price.....	¢ 3.25
Burden's "H. B. & S." Iron, base price.....	¢ 3.05
Norway Bars.....	¢ 3.50

## Merchant Steel from Store—

Bessemer Machinery.....	per lb. 2.00
Toe Calk, Tire and Sleigh Shoe.....	2.50 to 3.00
Best Cast Steel, base price in small lots.....	7¢

## Sheets from Store—

	One Pass, C.R.	Soft Steel.	Cleaned.	R. G.
No. 16.....	¢ 2.90	3.09		
Nos. 18 to 21.....	¢ 2.95	3.10		
No. 22 and 24.....	¢ 3.05	3.24		
No. 26.....	¢ 3.10	3.30		
No. 28.....	¢ 3.20	3.50		

## Russia, Planished, &c.

Genuine Russia, according to assortment.....	¢ 12 @ 14½
Patent Planished, W. Dewees Wood.....	¢ 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

## Galvanized.

Nos. 14 to 16.....	¢ 3.20
Nos. 22 to 24.....	¢ 3.55
No. 26.....	¢ 3.75
No. 28.....	¢ 4.10

## Genuine Iron Sheets—

	Galvanized.
Nos. 22 and 24.....	¢ 5.75
No. 26.....	¢ 6.25
No. 28.....	¢ 7.25

## Corrugated Roofing—

	2½ in. corrugated.	Galv'd.
No. 24.....	¢ 100 sq. ft. \$3.55	4.40
No. 26.....	¢ 100 sq. ft. 2.95	4.70
No. 28.....	¢ 100 sq. ft. 3.60	5.75

## Tin Plates

American Charcoal Plates (per box.)	
A.A.A. Charcoal:	
IC, 14 x 20.....	\$6.35
IX, 14 x 20.....	7.70

A. Charcoal:	
IC, 14 x 20.....	\$5.30
IX, 14 x 20.....	6.40

American Coke Plates—Bessemer—	
IC, 14 x 20.....	\$4.40
IX, 14 x 20.....	5.40

## American Terne Plates—

IC, 20 x 28 with an 8 lb. coating.....	\$8.50
IX, 20 x 28 with an 8 lb. coating.....	10.50

## Bolts—

Carriage, Machine, &c.—	
Common Carriage (cut thread):	
¾ x 6 and smaller.....	70¢ to 75¢
1 and larger.....	85¢ to 90¢

Common Carriage (rolled thread):	
¾ x 6, small "r" and shorter.....	70¢ to 75¢
Phila. Eagle, \$3.0 list.....	80¢ to 85¢

Bolt ends with C. & T. Nuts.....	65¢ to 70¢
Machine (Cut Thread):	
¾ x 4 and smaller.....	70¢ to 75¢
Larger and longer.....	65¢ to 70¢

## Nuts

	Blank or Tapped.	Off list.
Cold Punched:		
Square.....	5.00	5.00
Hexagon.....	5.60	5.60
Square, C. & T. & R.....	5.40	5.40
Hexagon, C. & T. & R.....	6.20	6.20

Hot Pressed:		
Square.....	5.50	5.50
Hexagon.....	5.90	5.90

## Seamless Brass Tubes—

List November 13, 1908.....	Base price 15¢
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## Brass Tubes, Iron Pipe Sizes—

List November 13, 1908.....	Base price 18¢
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## Copper Tubes—

List November 13, 1908.....	Base price 22¢
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## Brazed Brass Tubes—

List August 1, 1908.....	30¢ to 35¢
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## High Brass Rods—

List August 1, 1908.....	15¢ to 18¢
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## Roll and Sheet Brass—

List August 1, 1908.....	15¢ to 18¢
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## Brass Wire—

List August 1, 1908.....	15¢ to 18¢
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## Copper Wire—

Base Price.....	Carload lots mill 15½¢
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## METALS—

### Tin—

Strait's Pig.....	¢ 35 @ 35½¢
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### Copper—

Lake Ingot.....	¢ 14½ @ 15 ¢
Electrolytic.....	¢ 14½ @ 15 ¢
Castings.....	¢ 14½ @ 15 ¢

Sheet Copper Hot Rolled, 16 oz (quantity lots) ¢ 18 ¢	
Sheet Copper Cold Rolled, 1¢ ¢ advance over Hot	
rolled.....	¢ 18 ¢

Sheet Copper Polished 20 in. wide and under, 1¢ ¢	
square foot.....	¢ 18 ¢

Sheet Copper Polished over 20 in. wide, 2¢ ¢ square	
foot.....	¢ 18 ¢

Planished Copper, 1¢ ¢ square foot more than Polished,	
Western.....	¢ 18 ¢

### Spelter—

Western.....	¢ 7½ @ 7½¢
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### Zinc.

No. 9, base, casks.....	¢ 8½ @ 1 Open..... ¢ 9 ¢
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### Lead.

American Pig.....	¢ 5½ @ 5½¢
Bar.....	¢ 6½ @ 6½¢

### Solder.

1¢ & ½¢ guaranteed.....	¢ 21¼ @ 21¼¢
No. 1.....	¢ 18¼ @ 18¼¢
Refined.....	¢ 16½ @ 16½¢

Prices of Solder indicated by private brand vary according to composition.	
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### Antimony—

Cookson.....	¢ 10 ¢
Halletts.....	¢ 10 ¢
Other Brands.....	@ 9½¢

### Bismuth—

Per lb.....	\$2.00 @ \$2.25
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### Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot	
for remelting.....	24¢
Rods & Wire.....	Base Price 31¢
Sheets.....	Base Price 33¢

### Old Metals.

Dealers' Purchasing Prices Paid in New York	Cents
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Copper, Heavy cut and crucible.....	¢ 11.50 @ 11.75
Copper, Heavy and Wire.....	¢ 11.00 @ 11.25
Copper, Light and Bottoms.....	¢ 10.00 @ 10.25

Brass, Heavy.....	¢ 7.75 @ 8.00
Brass, Light.....	¢ 6.50 @ 6.75
Heavy Machine Composition.....	¢ 10.50 @ 10.75

Clean Brass Turnings.....	¢ 7.50 @ 7.75
Composition Turnings.....	¢ 8.50 @ 8.75
Lead, Heavy.....	¢ 3.75
Lead, Tea.....	¢ 3.50
Zinc Scrap.....	¢ 4.50

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